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PROCEEDINGS

OF THE

Bristol Naturalists' Society

EDITED BY T.E. THOMPSON
ASSISTED BY A COMMITTEE

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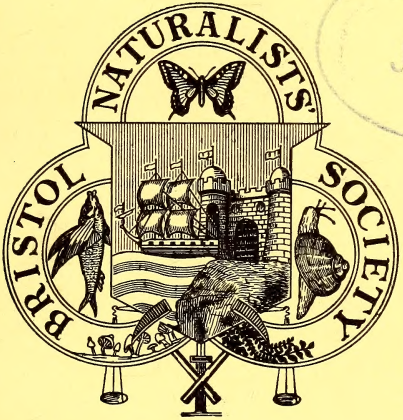

"Rerum cognoscere causas"–Virgil

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All articles for inclusion in the next issue of the *Proceedings* should be sent to:–

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BRISTOL, BS8 1UG

NOT LATER THAN 28th FEBRUARY, 1982.

Other instructions for authors appear on page 112.

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Applications for membership of the Society should be addressed to the Hon. Treasurer:–

P.J.M. NETHERCOTT, ESQ.,
6 HAZELWOOD COURT,
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BRISTOL, BS9 1PU

Enquiries concerning Field Meetings should be made of the Hon. Secretary, Field Committee:–

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59 FALCONDALE ROAD,
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BRISTOL, BS9 3JP

All other communications should be addressed to the Hon. Secretary:–

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CYRIL EWART LEES

ISSN 0068-1040

PROCEEDINGS OF THE BRISTOL NATURALISTS' SOCIETY

VOLUME 40

1980

Frontispiece: Mr C.E. Lees, 1888-1980

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Bristol Naturalists' Society

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R.G. THOMAS
T.E. THOMPSON, Ph.D., D.Sc.
K.T. BATTY

REPORT OF COUNCIL, 1980

Membership at the end of the year stood at 751 including 11 juniors.

At the AGM the officers and members of Council were elected with Dr J. Cowie as President.

The annual supper was held in April when Miss E. Fleure and Miss M.H. Rogers gave an illustrated talk on 'Tunisia and Morocco'.

The President has invited Past Presidents and other members of Council to join a Steering Committee to review objectives and the activities of the Society.

During the year two issues of the Proceedings have been published - it is hoped to continue the Proceedings on a yearly basis.

We regret to announce the deaths of W.H.B. Stridge, Mrs G.A. Wynn, C.E. Lees, Mrs I.C.I. Milton and H.T. Bunce.

Mrs I.C.I. Milton joined the Society in 1946 and was a member of Council in 1952 and 1953 and of the Botanical Section Committee from 1962 to 1966. With her husband, who survives her, she was a regular supporter of our Field, Botanical and Ornithological Section meetings. Together in 1965 they led an unusually interesting meeting to see commercial willow growing on West Sedgemoor and the cultivation of the teasel at Fivehead. Mrs G.A. Wynn, who joined in 1965, was a regular supporter of our meetings. She did the Society much service with hand-delivering the bulletin and each month tramped many a mile in the Westbury-on-Trym area putting envelopes through letter-boxes.

ACCOUNT OF GENERAL MEETINGS, 1980

January: Presidential Address "Some Spectacular Scenery in the U.S.A.", by J.F.W. McOmie.

February: "How to live on a Coral Reef: Strategies for Survival among Red Sea Animals", by Dr R. Ormond.

March: "The Making of 'Life on Earth' - Amphibians" by Mr Richard Brock.

October: Members' Evening.

November: "Farming and Wildlife", by Mr J. Hughes of the Gloucestershire Trust.

December: "Problems of Management in a Variety of National Parks", by Professor I.G. Simmons.

GENERAL FIELD MEETINGS, 1980

Fifteen meetings were held, including four afternoon field meetings, and were generally well attended. A list of the meetings with leaders and an indication of things seen is given below. A fuller account is kept in the records of the Field Committee. In the following list the leader is given first, followed by the area visited.

26 Jan.	Mr D.A.C. Cullen. Clevedon Sea Wall. Birds.
23 Feb.	Mr R. Curber. Frampton-on-Severn: estuary shore. Berkeley Canal, gravel pits. Birds.
29 March	Miss C. Groves. Great Bustard Trust. Porton Down. Some captive bustards were seen, also stone curlew on the Down.
4 April	Mr H.G. Hockey. Upton-on-Severn, British Camp on Malverns. Eastnor Park for a fine collection of trees.
31 May	Miss C. Groves. Sheldon Manor. A 15th century manor house, garden and a harness-trained llama.
8 June	Mr D.A.C. Cullen. Hod Hill for an Iron Age hill fort, Roman camp, plants, butterflies and birds. Worth Matravers and Durlston Head for plants and sea-birds.
18 June	Mr V.J. Kenney. An afternoon walk from Canford Park through the Blaise estate.
26 June	Miss C. Groves. An afternoon walk through the grounds of Goldney House.
3 July	Miss R.C. Lee. Tickenham via Cadbury Camp to Walton-in-Gordano. Plants and birds.
13 July	Miss R.C. Lee. Dunster. A walk over Grabbist Hill in very wet conditions, and exploration of Dunster. Plants and antiquities.
23 July	Miss J. Cox. Arnos Vale to Hanham along the Avon. Plants.
12 Aug.	Dr A.F. Devonshire. Frome Valley from Eastville Park to Oldbury Park. Plants and industrial archaeology.
30 Aug.	Mr R. Curber. Keyhaven to Pennington. A walk along the salt marshes for waders and other birds, including black-tailed Godwit and a ruff.
13 Sept.	Dr A.F. Devonshire. Trelleck to Tintern following the Wye Valley walk and a short walk up the Angeddy Valley. Trees, plants, and industrial archaeology.
26 Oct.	Mrs V.J. Kenney. Forest of Dean. The party visited Blaize Bailey, Blackpool Bridge, Boys Grave, Cannop Ponds, and stoneworks. Trees, fungi and industrial archaeology.

A.F. DEVONSHIRE
Hon. Field Secretary

Accounts for the

1979		£	£
	Members' Subscriptions		
1731	**Full members**	1706.00	
155	**Full members of the same household**	153.50	
31	**Corresponding members**	46.25	
24	**Associates**	31.75	
20	**Juniors**	13.75	
28	**Affiliated societies**	33.25	
1989			1984.50
5	Donations		11.35
155	Proceedings Grants	35.00	
	Sales	59.72	94.72
17	Sale of journals and books		-
31	Field Committee : profit		63.60
12	Buffet supper : profit		3.80
148	Interest on deposit account		216.66
2	Interest from National Savings Bank		2.50
36	Interest and premium on Bonds		42.00
31	Members' contributions to the Harry Savory Illustrations Fund		8.25
36	Members' Contributions to the Conservation Appeal		64.85
2	Overpaid subscription		2.50
-	Return of Junior Section balance		11.50
1983	Balance from last account		2023.59
£4447			£4529.82

P. J. M. NETHERCOTT
Hon. Treasurer
9 January 1981.

ear ended 31 December 1980

1979		£	£
616	General printing and stationery	610.41	
401	Postages and telephone	430.95	1041.36
890	Proceedings (1978 and 1979)		1920.75
166	Books	147.10	
94	Subscriptions for journals etc.	116.00	
5	Replacement of lost journals	-	
32	Binding	-	
10	Fire Insurance (library)	9.57	
-	Book plates	34.50	307.17
18	Contributions to Council for Nature, S.W.N.U. etc.		7.80
-	Bristol Waterworks Co. Chew Valley Lake Conservation donation		24.25
13	Expenses of general indoor meetings		29.85
175	Grants to Sections :		
	Botanical	20.00	
	Mammal	30.00	
	Ornithological	60.00	
	Geological	-	
	Entomological	25.00	135.00
4	Refund of overpaid subscriptions		—
	Balances to next account :		
149	Cash in bank, current account	206.70	
1329	Cash in bank, deposit account	446.04	
50	Deposit in National Savings Bank	52.80	
400	£200 8½% British Savings Bonds	200.00	
95	In hands of Field Committee	158.10	1063.64

Notes: (1) Earmarked for the Harry Savory Illustrations Fund £136.94

(2) Earmarked for the Conservation Appeal £76.60

(3) These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £179.32

4447			£4529.82

Audited and found correct
T. B. SILCOCKS
Hon. Auditor.
4 February 1981.

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Audited and found correct
T. B. SILCOCKS
Hon. Auditor.
4 February 1981.

REPORT OF THE BOTANICAL SECTION, 1980

At the Annual General Meeting held in the Botany Department Herbarium on January 28th, 1980, the following were elected:- President: Dr A.F. Devonshire; Secretary and Treasurer: Mr A.L. Grenfell; Committee: Miss I.F. Gravestock, Dr T.E.T. Bond, Mrs N. Vaughan Davies, Mr C.W. Hurfurt, Mr P.J.M. Nethercott, Mrs P.H. Royle, Mrs T.B. Silcocks, Dr M.C. Smith, Mr C.M. Lovatt and Mr A.C. Titchen.

The following winter meetings were held:-

28 Jan.	Annual General Meeting and Members' Evening.
25 Feb.	The Avon Wildlife Trust, by Dr A. Lea and Mr A. Pinches.
24 March	The Historical Flora of the Avon Gorge by Mr C.M. Lovatt.
27 Oct.	Flora of the Lizard Peninsula, by Mr J. Hopkins.
24 Nov.	Amenity Horticulture, by Mr P. Thoday.

The following field excursions took place, under the leadership of those shown:-

8 March	Goblin Combe for lichens. Dr D. Hill.
26 April	Bath Botanic Garden. Dr A.F. Devonshire.
17 May	Jermyn's Arboretum, Romsey. Dr M.C. Smith.
21 May	Durley Hill, Keynsham. Messrs A.L. Grenfell and C.W. Hurfurt.
21 June	Southerndown and Nash Point. Mr C.W. Hurfurt.
24 June	Cumberland Basin. Dr A.F. Devonshire.
5 July	Scottsquar Hill, Edge. Mrs P.H. Royle and Mrs T.B. Silcocks.
15 July	Lawrence Weston Tip. Miss I.F. Gravestock.
26 July	Long Lane, Backwell. Mrs N. Vaughan Davies.
2 Aug.	Kenn Moor. Mr P.J.M. Nethercott.
16 Aug.	Pill to Portbury. Mr C.M. Lovatt.
27 Sept.	Brislington Tip. Mr A.L. Grenfell.
4 Oct.	Fungus Foray, Brockley Combe. Dr T.E.T. Bond.
19 Oct.	St Phillips Marsh. Mr A.L. Grenfell.

In addition to the above, evening meetings were held in the Avon Gorge on 27 May, 17 June and 22 July. Messrs C.M. Lovatt and A.L. Grenfell.

A.L. GRENFELL
Hon. Secretary

REPORT OF THE GEOLOGICAL SECTION, 1980

At the Annual General Meeting the following officers were elected:-

President: Mr P. Thompson
Vice-President: Mr V. Dennison
Secretary and Treasurer: Mr J. Toller
Field Secretary: Dr D. Hamilton

Committee: Mr A.E. Frey, Mrs G. Hamilton, Mr T. Harrison, Dr A.B. Hawkins, Miss E. Pounder, Mr A. Mattheison.

Ex-officio members: Professor D.L. Dineley; President of the Student Geology Society.

The winter programme included:

10 Jan.	Annual General Meeting and Presidential Address by Mr V. Dennison: Iceland.
21 Feb.	Symmetry in Geology. Dr R. Bradshaw
20 March	Sabhhas - aris coastal plains: their importance in the deposition of evaporites. Dr G. Evans.
16 Oct.	Early Works of the Bristol Naturalists' Society. Dr M. Crane.
20 Nov.	Hawaiian Volcanoes. Dr C. Wood.
12 Dec.	Members' Evening, Bristol Museum. Mr A. Mattheison and Staff.

Field excursions:

27 April	Building Stones Walk. Mr I.H. Ford
18 May	Vallis Vale, Holwell. Mr C. Copp
8 June	Northampton Ironstones. Dr R. Bradshaw (with W.E.G.A.)
20 July	Tortworth area. Dr M. Curtis
14 Sept.	Sand Bay Tidal Flats. Dr D. Hamilton

J. TOLLER
Hon. Secretary

REPORT OF THE MAMMAL SECTION, 1980

At the Annual General Meeting the following officers were elected:- President: Mr R.A. Burberry; Joint Secretary/Treasurers: Mrs C. Kitchen and Mr M.A.R. Kitchen; Mammal Recorder: Mr A.F. Jayne; Committee Members: Mrs D. Grant, Miss E.J. Lenton, Mr J. Grant, Mr S. Nichols.

Six indoor meetings were held:-

15 Jan.	AGM and Presidential address.
12 Feb.	Bovine tuberculosis and the badger. Mr J. Gallagher and Mr G. Turrell.
11 March	Natural History in Gambia and Senegal. Mr M.A.R. Kitchen.
17 Oct.	Shrews. Dr R. Loxton.
11 Nov.	Breeding Reptiles and Amphibians. Mr M.A. Linley.
9 Dec.	Ghana and Nigeria. Dr R.A. Avery

The following field meetings were held:-

27 Jan.	Town Fox Spotting. Mr J. Grant.
24 Feb.	South Gloucestershire Badger Sett Survey. Mr R.A. Burberry.
16 March	Nortons Wood and the Gordano Valley. Mr M.A.R. Kitchen.
20 April	Kings Wood and River Yeo. Mr M.A.R. Kitchen.
18 May	Spanorium Hill. Mr J. Grant.
6 June	Badger Watch. Miss E.J. Lenton.
20 July	Oldbury and Littleton. Mr R.A. Burberry.
16 Aug.	Roe Deer Watch. Mr M.A.R. Kitchen.
15 Sept.	Bat survey. Mrs C. Kitchen.
4 & 5 Oct.	Live Trapping in Leigh Woods. Miss E.J. Lenton.
16 Nov.	Plaster Casting in Wye Valley. Mrs C. Kitchen.
7 Dec.	Chewton Keynsham. Mr B. Howard.

Attendance at indoor meetings has improved slightly when set against the decline of the last few years. Field meetings however have continued to attract very poor support. One Field weekend to the New Forest was cancelled, only two members having shown an interest in the proposed trip!

Unfortunately it proved impossible to complete the Mammal Records in time for publication in this issue. It is intended to combine the 1980 and 1981 records in the next issue.

C. KITCHEN
M.A.R. KITCHEN
Hon. Secretaries

REPORT OF ORNITHOLOGICAL SECTION, 1980

During 1980 ten indoor meetings were held, four of them designed for beginners, a series of three in the Autumn being planned by B. Gray covering basic birdwatching techniques and methods. Attendance averaged around 35, which was disappointing. There were 26 Field meetings held right through the year, none involving coaches, most being well supported.

The section was involved in four national surveys run by the BTO, the Rookery survey, in which the whole county was counted, the Nightingale survey, the Lesser Black-backed Gull survey, and was invited to participate in a trial for the Winter Atlas survey on the basis of its experience over the past two winters. Members also contributed to the Nest record scheme, and many were involved in bird-ringing. A local gull group monitored gull populations, and members supported local enquiries into the status of Crows and Magpies in Bristol, of Kestrels, Sparrowhawks and Buzzards in Avon county, and of Lapwings and other waders in the county. There was also a continuing monitoring of overwintering warblers, and the birds in gardens scheme, and river Avon counts continued.

A fieldwork review was published, containing details of fieldwork between 1976 and 1978, and the first Avon county report covering the birds of the county in 1979 appeared in a separate cover from the Proceedings for wider sale.

At the 56th Annual General Meeting Mrs J. Humphris was re-elected President, R.L. Bland Secretary and H. Rose Treasurer. Miss J. Taylor and B. Lancastle were elected to the committee, other members being re-elected. Only R. Thomas left, having completed his post-presidential year on the committee.

R.L. BLAND
ex-Hon. Secretary

REPORT OF THE LIBRARIAN, 1980

Members registered as library users now total 85. The number of visits made by such users has also increased slightly this year, to 150, although the borrowing statistics have remained more or less the same, with 46 members borrowing 232 items.

Seventeen books have been added to the Library, and donations from Mr Barrett, and from the Ashmolean Natural History Society, have been gratefully received. A specially designed book-plate is now being inserted in all donated volumes.

Members of the Library Committee have been kept busy in attempts to make the Library more attractive and easier to use. Rearrangements to make the best use of the limited space available have included moving the general natural history and the ornithology books from cupboards to the open shelves. On two evenings in May, the Library was again able to take advantage of the City Museum's open evenings to receive visitors. Four members called in on the first evening, but none on the second - which was then turned into an extra working evening!

Once again we must record our thanks to the Controller of the City Museum and Art Gallery and to the University Librarian for providing us with accommodation and storage space.

JENNIFER SCHERR
Hon. Librarian

OBITUARY : CYRIL EWART LEES

CYRIL EWART LEES died in Oxford on 11 February 1980 at the age of 92. He was born in North Staffordshire on 2 February 1888 into a family where both father and grandfather were chemical manufacturers.

He went to the University of Birmingham to study chemistry but soon came under the influence of Charles Lapworth the distinguished professor of geology and eventually graduated in geology and physics. A career in geology was advised against on medical grounds so he took up teaching and after posts in several parts of the country he was appointed headmaster of Camelford Grammar School, North Cornwall, a position he held for thirty-one years.

He became a Cornishman by adoption and soon was immersed in the history, natural history and especially the geology of his adopted county. His knowledge of the metamorphic and igneous rocks of east and north Cornwall was extensive and he led many parties to study them. He was President and Gold Medallist of the Royal Geological Society of Cornwall and contributed papers to the Transactions.

He had an insatiable curiosity, a love of conversation and discussion, and a kindly wit so that he always had a wide circle of friends who held him in great respect. Former pupils, many of whom attained positions of distinction and responsibility in many countries, looked on him with affection and often visited him for advice and encouragement.

He described himself as a humanist and a Gladstonian Liberal. Through his wife's family he had very close connections with the Foot family, especially with Isaac, and in the elections of 1950 and 1951 he was active in support of (Sir) Dingle Foot who was Liberal candidate for North Cornwall.

On the death of his wife he came to Bristol in 1953 and soon became active in the Society, particularly in the Geological Section where he was, over a period of years, committee member, vice-president and president (on two separate occasions); he was a member of Council in 1959-60 and 1962-69. He lectured to the Section, led a number of field excursions (including some for the Geologists Association of London of which he was a Life Member) and published four papers in the Proceedings, usually in collaboration with either F. Stenhouse Ross or W.F. Vernon. The trio formed an active, vocal and enthusiastic group both within the Society and in Extra Mural Classes in the University. On one occasion he remarked to the writer 'Do you realize, Mr Tutor, that the combined age of the three students on the front row is 225 years?' He was also closely associated with the geological departments of both the University and City Museum and was a frequent and valued visitor to both.

For many years after his move to Bristol he was a forceful and active member of the Brentry Hospital Management Committee.

Cyril Lees had an abiding love of literature and for over forty years he was literary critic and book reviewer for the 'Western Morning News'; his letters are said to have been a delight. Landscape painting in which he had some skill was another great interest and his paintings grace the walls of several members of the Society and others.

Close friends say that Cyril Lees was entirely without malice and never said an unkind word about anybody. He was certainly an entertaining and stimulating companion whose death has left many people the poorer, but whose life enriched them.

He leaves two married sons, the elder of whom has just retired as Librarian of Rhodes House Oxford, the younger is Farm Produce Officer for Scotland and Northern Ireland and to them we offer our sympathy.

THE RUBI OF THE AVON GORGE

by C.M. LOVATT

(Department of Botany, University of Bristol)

INTRODUCTION

In recent years, little attention appears to have been paid to the diverse Rubus flora of the Avon Gorge by either local or visiting botanists. The genus, as represented in the Gorge, consists of R. idaeus L. (the raspberry), R. caesius L. (the dewberry) and the R. fruticosus aggregate (the brambles). R. idaeus does not hybridise with other Rubi in the Avon Gorge and causes no problems in identification. It occurs locally on both sides of the Gorge and is not mentioned further. The R. fruticosus aggregate is one of the most difficult groups in the British flora. Some 290 species, or more correctly microspecies, are recognised by current experts, whose treatment differs considerably from that in Watson (1958), the most recent monograph (see Newton 1980). In addition, hybridisation may occur between R. ulmifolius Schott (a sexual diploid) and other brambles (all polyploid apomicts) with R. caesius also able to enter into hybrid combinations (Newton 1975). For the most part, therefore, only the identifications of current experts may be accepted.

The only previously published comprehensive account of the Avon Gorge brambles is that in the Flora of Bristol (White 1912). J.W. White, who himself described several new Rubi, wrote that 'the brambles of this district have been rather carefully worked out' and gave records for 25 species in the Gorge (White 1912). The Bristol University herbarium (BRIST) (abbreviations for herbaria follow Kent 1957) includes the collections of J.W. White, C. Bucknall and D. Fry which contain vouchers for most of these records; the gatherings were renamed by A. Newton in 1979.

Rubus was also considered critically in the other Local Floras and Supplements covering all or part of the Avon Gorge. The account in Swete (1854) was brief and is outdated and those in Murray (1896), Marshall (1914) and Riddelsdell et al. (1948) were, as far as the Gorge was concerned, mainly based on the earlier work of J.W. White, but with nomenclature altered in line with contemporary views. The account in White (1887) was superceded by that in White (1912) to which White (1918) added little. It is therefore rarely necessary to cite these other accounts. Additional records are scattered throughout the botanical literature; reference is made to them only where a new or more precise locality was given, or where the record was accepted by J.W. White after 1912 as a species new to the Avon Gorge.

In July 1979, with the guidance of C. Bannister, the writer made over 30 gatherings. These were determined or confirmed by A. Newton and included 14 species and one named hybrid. In July 1980, A. Newton and E.S. Edees visited the Gorge with the writer and verified 17 species and two named hybrids. The writer gathered vouchers for new records: both years' gatherings are in his herbarium (Hb. C.M.L.), only R. laciniatus being collected by him at any other time. In all, some 100 gatherings made over the last 140 years were seen by A. Newton.

SYSTEMATIC LIST

In the systematic list, the species identified by A. Newton and E.S. Edees are given in alphabetical order with the name (or names) used in White (1912) following in parentheses: it is not implied that records given in White (1912) under those names for localities outside the Avon Gorge may be similarly placed. Where no synonym is given, the species is apparently new to the Avon Gorge. The distribution of the species in the Gorge is then summarised using 'G' for the v.c.34 (Clifton) side and 'S' for the v.c.6 (Leigh Woods) side. Parentheses indicate that the species was not found on that side in 1979 or 1980 and '?' indicates that no acceptable voucher has been traced. In the locality lists, '*' indicates at least one voucher specimen (with the date given) for a record in White (1912) in the White, Bucknall or Fry herbaria. 'W' indicates a record in White (1912) for which there is no such voucher. '!' following the date 1979 or 1980 indicates a voucher in Hb. C.M.L. Dated field records refer only to the two forays; other field records and summaries are the responsibility of the writer. Hybrids are given after the first-mentioned parent. R. caesius and its derivatives are discussed after the main account, as are several unconfirmed species. It is hoped to prepare an illustrated key to the Rubi of the Avon Gorge for publication at a later date.

R. affinis Weihe & Nees; (R. affinis); (G).
Clifton Down, Atwood (Swete 1854); 'Still there in several spots at the lower end of the Green Valley' (1897*).

R. cardiophyllus Muell. & Lefev.; (R. macrophyllus, R. rhamnifolius); G, (S).
'Clifton Down, C. Bucknall' (1902*, as R. macrophyllus). 'Upper part of the Green Valley, Clifton Down, abundant' (1907*; 1921*, as R. rhamnifolius). In plenty by the railways under Sneyd Park (W). A bush at top of Gully, Durdham Down (1980!). Leigh Woods, seen in situ in 1889 (Focke 1890). The species was also collected by White at 'Beggar's Bush Lane, near Failand, 1887'.

R. conjungens (Bab.) Warren; G.
St Vincent's Rocks below Observatory Hill (1979!).

R. dasyphyllus (Rogers) E.S. Marshall; (R. dasyphyllus); G?, S.
'Clifton Down, near Bridge Valley Road' (W). A stem leaf in a mixed gathering 'Durdham Down, 1921, N.Y. Sandwith' (BRIST) was 'apparently this species' fide A. Newton. Leigh Woods (Babington 1869, fide White 1912 but recorded by Babington under R. Koehleri var. pallidus). A bush on the Nightingale Valley side of the 'Plain', near Wardens Cottages, Leigh Woods (1979!, shade form fide A. Newton).

R. diversus W.C.R. Wats.; (R. Kaltenbachii); G, S.
'Slope below the Promenade, Clifton Down' (W); Green Valley, plentiful (1979!). 'Top of New Zigzag, 1956, G.W. Garlick' (BRIST). Still there. 'Near the Avon, under Sneyd Park' (White & Fry, 1891*). Cook's Folly Wood (1979

field record). 'Leigh Woods near the head of the second valley below the Suspension Bridge, and in several other places' (W); shown to be more widely spread after timber cutting (White 1920). Two sheets from 'Leigh Woods' in Hb. H.O. Stephens (BRISTM, in main collection), one marked 'R. Radula? Babington in litt.' and the other in a folder marked R. fusco-ater. This large-leaved species attains dominance in the more shaded parts of the Leigh Woods plateau, and also occurs by the Towpath near Paradise Bottom.

R. eboracensis W.C.R. Wats.; G, S.
Below ventilation shaft, Gully (1980!). 'A little' seen by A. Newton, 1980, on a Forestry Commission pathside, Leigh Woods.

R. fuscicaulis E.S. Edees; (R. fuscus); G, S.
After receiving a variety of names in the 1880's (see White 1912 under R. Babingtonii, R. Bloxamii and R. scaber), Focke (1890) stated that this Leigh Woods bramble was 'closely allied' to R. fuscus. Edees (1980) discussed the plant under R. fuscicaulis, 'There may be more than one taxon ... Some of the specimens ... seem to me to be R. fuscicaulis, but others are too heavily armed and have rounder terminal leaflets and patent to erect sepals'. A. Newton commented in 1979 on the BRIST material, 'Leigh Woods fuscus appears to be a complex of probably ancient hybrids deriving pro max. parte from R. fuscicaulis E.S. Edees ... None of the specimens is R. fuscus'. After his visit to Leigh Woods where he collected specimens E.S. Edees wrote, 'it is satisfactory to note that Rubus fuscicaulis is widespread there and constant'. The plant occurs in both parts of Leigh Woods (1979!), as well as beside North Road and on the Towpath, preferring open habitats or moderate shade. Many specimens from Leigh Woods are in the national herbaria (Edees 1980); there are also too many at BRIST to cite here. Ashton Park (W); still there, by golf course.

A specimen 'Clifton Down, 1901, C. Bucknall' in BRIST was agreed by White, Fry and Bucknall 'too close to R. fuscus ... to be placed elsewhere' (see annotation on sheet), but was not cited in White (1912). It is R. fuscicaulis (det. A. Newton) which occurs on Clifton Down in the Green Valley (1979!) and near Proctor's Fountain (1979!; 1956 G.W. Garlick, BRIST).

The plant from the 'railway under Sneyd Park' (1891*; 1892*) is not R. fuscicaulis; it is distinguished by A. Newton as the 'Sneyd Park Plant'.

R. laciniatus Willd.; G.
On the wooded slope of the Gully, Clifton Down, (1977!). Previously reported by the writer in Willis (1981) 'Doubtless bird-sown from garden origin' fide A. Newton.

R. lanaticaulis Edees & Newton; S.
Path between the two plains near Stokeleigh Camp (1979!). 'R. sylvaticus, Leigh Woods' (Swete 1854) 'almost certainly' belongs here, fide A. Newton.

R. lindleianus Lees; (R. Lindleianus); (G, S).
Abundant in the Green Valley (undated*). 'Formerly at the edge of Leigh Woods' (W; a voucher 'Leigh Down, 1884, J. White' in LIV). The specimen in Hb. H.O. Stephens (BRISTM) cited in White (1912) under R. Lindleianus and labelled 'Leigh Wood. R. nitidus Babington in litt' was '?a mixture' fide A. Newton, but an unlocalised sheet in the same folder, presumably also from Leigh Woods was R. lindleianus.

R. longus (Rogers & A. Ley) A. Newton; (R. lasioclados var. angustifolius); G, S. In the Gully on the Downs, 1902 Riddelsdell' (W; the voucher at GLR). Still there, 1980. 'Conspicuous on part of the open Down' (White 1918). Green Valley (1979!). Proctor's Fountain, in and below Cook's Folly Wood (1979 field records). Leigh Woods, at the north-east end of 'The Paddock' (1979!). The species is also scattered on pathside in the Forestry Commission holding, and occurs at both ends of the Towpath under Leigh Woods (all 1979 field records).

R. milesii A. Newton; (R. Koehleri); (G).
'Under Sneyd Park' (1892*).

R. murrayi Sudre; (R. adornatus) G, S.
'Near the Railway under Sneyd Park' (White & Fry 1892, as R. scaber; 1890*; 1891*; 1892*). A bush there, C. Bannister, 1979; the writer's specimen is a mixture, the stem leaves 'look like R. murrayi' fide A. Newton. Several bushes at the bottom of the Gully, by the Portway (1980!). 'Leigh Wood, 1895, A. Ley' (W; no voucher in Hb. A. Ley at BIRM); several scattered bushes noted by A. Newton and E.S. Edees on Forestry Commission paths near the N.N.R., Leigh Woods.

R. polyanthemus Lindeb.; (R. pulcherrimus); G.
'At the top of the Green Valley' (W; named in situ by Rev. W.H. Purchas and 'probably correct' fide A. Newton). A bush at the top of the Gully, Durdham Downs (1980!).

R. procerus P.J. Muell.; G, S.
The cultivated 'Himalayan Giant' is widespread in the Avon Gorge both as a garden relic or throw-out (below Sneyd Park; in Cook's Folly Wood; near Proctor's Fountain; on the site of Wellington Cottage under Burwalls Wood) and as a bird-sown adventive (St Vincent's Rocks below the Observatory (1979!); in the Gully; beside the road to the Forestry Commission car park).

R. pyramidalis Kalt.; (R. pyramidalis); G, S?
'Clifton Down, below the Promenade in good quantity' (1905*). 'Near Cook's Folly Wood' (W). A large bush, Durdham Down, opposite Sea Walls Road (1979!). 'Leigh Wood, A. Ley' (W; no voucher in BIRM).

R. raduloides (Rogers) Sudre; (R. anglosaxonicus var. raduloides, R. Gelertii); G, S.
'Clifton Down, in the Green Valley' (1884*; 1901*). Wood margin between Green Valley and Observatory Hill, abundant (1979!). Proctor's Fountain (1979!). 'Railway under Sneyd Park' (undated*) and still there, 1979. Leigh Woods, side of plain opposite the Wardens Cottages (1979!, shade form). 'Leigh Wood, near the road half a mile from the Suspension Bridge, A. Ley! (W, as R. Gelertii; of the two vouchers in BIRM, the 1909 gathering was 'perhaps shade-grown R. raduloides' fide A. Newton but the 1905 gathering was un-nameable. Hybrids of R. raduloides on Clifton Down (W); R. raduloides x R. ulmifolius, Fairyland, Clifton Down, A. Newton, 1980.

R. rubritinctus W.C.R. Wats; (R. argenteus); G, S.
'Durdham Down' (1913*). 'By the railway below Sneyd Park' (1890*). 'By the Avon below Sea Walls' (W). Wood margins by the Promenade, Clifton Down (1979!). Also seen in the Green Valley and near Proctor's Fountain in 1979 and 1980. 'Sparingly on Leigh Down' (W). Leigh Woods, near the Wardens Cottages, A. Newton and E.S. Edees, 1980. A specimen in BRIST, 'Durdham Down, 1921' collected by N.Y. Sandwith 'could be R. rubritinctus x R. ulmifolius' fide A. Newton.

R. rufescens Muell. & Lefev.; (R. infecundus); G, S.
'By the railway under Sneyd Park' (undated*). Still there, 1979. 'In Cook's Folly Wood' (W). Still there, on sandstone (1979!). 'Leigh Woods, in several places' (W). 'Stokeleigh Camp, 1956, G.W. Garlick' (BRIST); both in and near the Camp, 1979 and 1980. Also by the Towpath near Paradise Bottom.

R. troiensis A. Newton; (R. Drejeri, R. mucronatus, R. scaber); G, S.
'Under Black Rock, 1891 and subsequently' (1891*, as R. mucronatus). Durdham Down by Sneyd Park (1909*, as R. Drejeri, with Rogers' letter quoted by White (1912)). Cook's Folly Wood (1979!, panicle only). A plant on a Forestry Commission path by the north-west corner of the N.N.R., Leigh Woods was determined in situ by A. Newton and E.S. Edees in 1980, the writer's specimen (1979!) from the same bush having been insufficient for a certain determination. 'Wood border between the Suspension Bridge and Rownham Ferry, 1905, A. Ley' (W, as R. scaber; the voucher in BIRM is R. troiensis fide A. Newton).

R. tuberculatus Bab.; G, S.
Below ventilation shaft, Gully (1980!). Beside North Road, Leigh Woods (1979!). Nightingale Valley at top and further down (1980 field records) and at bottom (1979 field record). Also near Viewpoint, Stokeleigh Camp (1979) and near Forestry Commission car park (1980).

R. ulmifolius Schott; (R. rusticanus); G, S.
This species is easily recognised and records without vouchers may be accepted. St Vincent's Rocks and Cook's Folly (Swete 1854). On limestone either side of the Green Valley (W). Durdham Down (1875, Hb. A.E. Hudd (in B.N.S. Library); 1927, Hb. J.W. White). R. ulmifolius is widespread in the open parts of the Gorge and Downs and is prominent in the hedgerow of Observatory Hill. In shade, indicating recent canopy closure, it occurs near Proctor's Fountain, in the Gully, in Cook's Folly Wood and near the Viewpoint in Stokeleigh Camp, Leigh Woods. Several hybrids are given above but R. ulmifolius x R. vestitus is the most common: Leigh Woods (W, as R. rusticanus x R. leucostachys; a specimen, J.W. White, 1889, as R. leucostachys from Leigh Down in LIV). Field records (1980) for below Observatory Hill, beside North Road and near the Forestry Commission car park, Leigh Woods.

R. vestitus Weihe & Nees; (R. leucostachys); G, S.
Clifton Down, Cook's Folly Wood and under Sneyd Park (W). Leigh Woods (1883*). The pure species was noted throughout the Gorge in 1979 and 1980, in all of White's localities and in the Green Valley, near Proctor's Fountain, in the Gully and in both parts of Leigh Woods. A specimen in Hb. H.O. Stephens from Leigh Woods (BRISTM. as R. leucostachys) was a R. vestitus derivative as was one from the Green Valley (1979!). In open woodland the species and its derivatives may attain dominance.

R. wirralensis A. Newton; G?, S.
Cook's Folly Wood (1979!), 'sterile, perhaps a derivative of R. wirralensis' fide A. Newton. With E.S. Edees he found a bush of the true plant at the south end of the Towpath below Leigh Woods (1980!).

R. caesius L., its hybrids and the section Triviales P.J. Muell.
The section Triviales contains both ancient and recent hybrids between the apomictic R. caesius and species in the R. fruticosus aggregate (Newton 1975). The ancient hybrids behave as species and some are named as such; the recent hybrids are colonisers of disturbed ground such as river and railway banks (Newton 1975).

R. caesius has been recorded on Durdham Down (1875, Hb. A.E. Hudd, not seen by A. Newton), by the Avon, G. (Sandwith 1918) and in 'Leigh Woods' (Swete 1854). The pure species was noted by the Towpath under Burwalls Wood (with hybrids, 1980 field record) and by the marsh opposite Bridge Valley Road (1979 field record). The 'remarkable form' found by I.W. Evans under Nightingale Valley (Sandwith 1946) is **represented** in his herbarium (BRISTM) and in Hb. J.H. Davie (BRIST). The latter specimen was 'a hybrid' fide A. Newton.

Un-named or un-nameable plants in the section have been collected under Cook's Folly Wood (1979!) and in Stokeleigh Camp, Leigh Woods (1956, Hb. G.W. Garlick (BRIST)). A specimen from the Towpath under Burwalls Wood (1979!) was a hybrid of R. ulmifolius with the section.

In the main list above R. conjungens and R. eboracensis are named eglandular species in the section. R. tuberculatus is the only glandular Triviales species confirmed in the Gorge. R. corylifolius (Swete 1854) and R. corylifolius var. sublustris (W) refer to 'eglandular Triviales' fide A. Newton and the record of R. dumetorum var. scabrosus in 'open spots in Leigh Woods' (W) 'will almost certainly be R. tuberculatus 'forma aprica'' fide A. Newton.

UNCONFIRMED RECORDS

(R. bartonii A. Newton)
A specimen collected in the Gorge by C. Bannister in 1979 but not represented in Hb. C.M.L. was 'very close indeed to R. bartonii, a mainly Welsh species, but cultivated as 'Ashton Cross' at Long Ashton Research Station' fide A. Newton.

(R. echinatus Lindl.)
Leigh Woods (Babington 1869, under R. rudis but put under R. echinatus in White (1912)). 'Probably correct' fide A. Newton.

(R. insectifolius Muell. & Lefev.)
'Clifton Down, 1916' Hb. C. Bucknall (BRIST, as R. pallidus). 'Probably R. insectifolius' fide A. Newton.

It is not possible here to account for all the names erroneously applied to Avon Gorge brambles but there remain unmentioned only four species accepted by J.W. White. There is no voucher in BIRM for Ley's 1905 record of *R. ericetorum* in Leigh Woods (W); the record does not belong under *R. moylei* (cf. Riddelsdell et al. 1948) fide A. Newton. *R. hypoleucus* 'Clifton Down, 1900, in small quantity C. Bucknall' (undated*, as R. *micans*) is represented by a specimen of 'hybrid appearance' *fide* A. Newton. D. Fry annotated the sheet 'Bucknall ... has not been able ... to refind the plant'. Two species from Clifton Down were recorded by H.J. Riddelsdell and G.C. Brown (White 1926). *R. Bakeri* was 'almost certainly a small-leaved form of *R. cardiophyllus*' and *R. lentiginosus* was 'almost certainly an error' *fide* A. Newton.

CHANGES IN THE AVON GORGE BRAMBLE FLORA SINCE 1912

White (1912) recorded 25 species: the above list gives 24 confirmed species. Many of White's records are now placed under new names and in some cases he gave several entries for what is currently considered a single species. *R. laciniatus*, *R. procerus* and perhaps *R. tuberculatus* may be the only true additions to the flora. Apart from these and the other named Triviales, only *R. lanaticaulis* and *R. wirralensis* were apparently unknown in the Gorge before the present survey. *R. affinis*, *R. lindleianus* and *R. milesii* have not been refound.

In terms of distribution and abundance, the best evidence of change is for the Green Valley where, on the acid soil, 'about twenty species of Rubi' occurred (White 1912, under *R. idaeus*). Although 'twenty' appears to be an over-estimate, only six species were recorded there in 1979 and 1980, with *R. affinis*, *R. cardiophyllus*, *R. dasyphyllus*, *R. lindleianus*, *R. polyanthemus* and *R. pyramidalis* not refound and with *R. fuscicaulis*, *R. longus* and R. rubritinctusas additions. These floristic changes are correlated with the succession from open ground, probably sheep and rabbit grazed 'grass heath' - hence the 'Green Valley' - with local 'thicket scrub' (cf. Tansley 1939) via birch wood (see Plate IX in Vaughan 1906) to the mixed secondary woodland there today. *R. lindleianus* was 'Abundant on the furzy slopes' (White 1912) but *Ulex gallii* (White's furze?) is now restricted to a small shaded area at the lower end of the valley, where *Calluna vulgaris* also occurs. It was there too that *R. affinis*, a species of open heathy ground (Watson 1958) was recorded in White (1912).

THE FLORA IN ITS PHYTOGEOGRAPHICAL CONTEXT

Newton (1980) mapped six regions based on the distribution of distinctive bramble communities (florulas). Bristol falls on the boundary of two such florulas with the Archenfield endemic complex of Herefordshire and the Wye Valley to the north. The following note was supplied by A. Newton (in litt., March 1980): 'The Avon Gorge *Rubus* flora reveals an amalgam of species representing several different elements. Widespread N.W. European species are well represented, viz. *R. affinis*, *R. cardiophyllus*, *R. dasyphyllus*, *R. echinatus*, *R. lindleianus*, *R. polyanthemus*, *R. pyramidalis*, *R. raduloides* and *R. vestitus*, (i.e. a flora) not significantly different from the surrounding area. (A. Newton added (*in litt.*, February 1981) that *R. wirralensis* is a widespread (British) endemic.) Widespread 'westerly' species are *R. longus* and *R. rubritinctus*. *R. fuscicaulis*, *R. lanaticaulis*, and *R. troiensis* belong to the Archenfield florula and are outliers of that. Southerly species are *R. diversus*, *R. milesii* and *R. murrayi*. Intrusive adventives are *R. laciniatus*, *R. procerus* and *R. tuberculatus*. *R. ulmifolius* is a characteristic thermophilous species of open sunny places, particularly on calcareous soils. Such a picture is very much what one might expect from the position of the area!'

FURTHER WORK

As White (1912) concluded his introduction to *Rubus*, 'it must not be assumed, however, that this acount of Bristol Rubi is considered to be exhaustive or in any sense final'. Further collection might provide additional records on the open Downs (although only *R. ulmifolius* appears common there), in the northern parts of Leigh Woods and in the vicinity of Sneyd Park. Gatherings in 1979 along the railway revealed mainly 'one-off plants and hybrids' *fide* A. Newton, although some of the Green Valley plants were said to reappear there (White 1912).

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STEEPHOLM, 1980

by A.J. PARSONS

A survey of the gull community, carried out by Drs G.P. Mudge and P.N. Ferns, showed a marked decrease since 1975 in the population of Herring Gulls (66% drop) and some decrease of Lesser Black-backed (6%) and Great Black-backed Gulls (27%). Present populations are estimated at 2723 pairs of Herring Gulls, 555 pairs of Lesser Black-backed and 30 pairs of Great Black-backed. A count of the Cormorant colony during this survey produced 49 pairs, a slight increase.

433 birds were ringed in autumn, including the island's first Wryneck and Wood Warbler, and another Firecrest. Peregrines were regular visitors and three Buzzards were seen in August. Shelduck and Mallard both nested and Willow Warblers probably and Blackcaps possibly nested.

Dr Oliver Gilbert carried out a very comprehensive survey of the lichen flora resulting in 71 species being added to the island list and a form new to science being discovered and named after the island - Candelariella medians f. steepholmensis O.L. Gilbert. Dr Gilbert also recorded five additional bryophytes and one additional grass (Lolium multiflorum) and J.V. Carrington identified Ranunculus sardous in June.

The paeonies were not all visited during the year because of the unstable nature of part of the cliff, but fertile seed production from inspected plants was better than last year. Allium ampeloprasum had a poor flowering season but the plants appear to be satisfactory. Senecio jacobaea was abundant (as it was elsewhere) but Smyrnium olusatrum and Conium maculatum were much reduced in numbers and stature.

Thirty-one species of invertebrates were added to the island lists, including Tetragnatha montana (Araneae), Ourapteryx sambucaria and Melanchra persicariae (Lepidoptera), and twenty-one species of Diptera.

PLANT REMAINS FROM MUMMY 7386 (HAR EM KEN ESI)

by D. GLEDHILL

(Department of Botany, University of Bristol)

The Bristol City Museum and Art Gallery had the advantage of experience gained and assistance given by Dr Rosalie David, who led an earlier unwrapping of the Mummy 1770 in Manchester, while planning the unwrapping of Mummy H7386. The Bristol mummy was showing signs of fungal decay so the unwrapping was performed in order to gain as much information as possible, rather than to allow further disintegration.

Unlike the Manchester exercise, it was decided that plant remains and pollen grains associated with the wrappings should also be investigated and this note is a brief comment on the occurrence of these with preliminary thoughts on the identity of the four species represented.

Har Em Ken Esi lived about 3000 years ago across the Nile from Thebes and Luxor. He died, at about 60 years old, when the embalmers' art was at its most proficient. His body escaped vandalism until the tomb, which long pre-dated him, was excavated in 1904.

Before embalming and wrapping, the soft organs were removed from his body and desiccated, to facilitate the desiccation of the whole corpse. The body cavities were re-packed with Natron, a salt mixture, prior to embalming and wrapping.

Embalming consisted of coating the body with resins (not yet analysed) which still retain their very pronounced antibiotic property and in which it is hoped to locate and identify pollen grains. Clearly, the presence of pollen will depend upon, or indicate, the season at which the embalming took place. The results may reveal something about the vegetation of Deir-el-Bahari.

The wrapping material is flaxen linen. The bindings are mostly without selvedges and were probably made by tearing large sheets into bandage-like strips. There are also larger pieces of linen, laid on, to pad the shape out. Huge quantities of these are also impregnated with resin and, whilst they also provide a potential wealth of pollen, have yielded a quantity of larger plant remains. The remains were found to have been incorporated at all stages during binding, and range from minute fragments, such as grass awns, intruded within the fabric, to large portions of grass leaf and inflorescences of at least three species of grass. One can surmise that the strips of binding were torn from the sheet, as required, and picked up the plant fragments from a floor which may have been covered with grasses - as floors were once strewn in this country.

Four plant species have been identified with some confidence, but the mass of small fragments may never be named. Identifications must, of course, be confirmed against authentic material but, although this is still to be done, I consider that an impression of the litter on the embalmer's floor can already be gained.

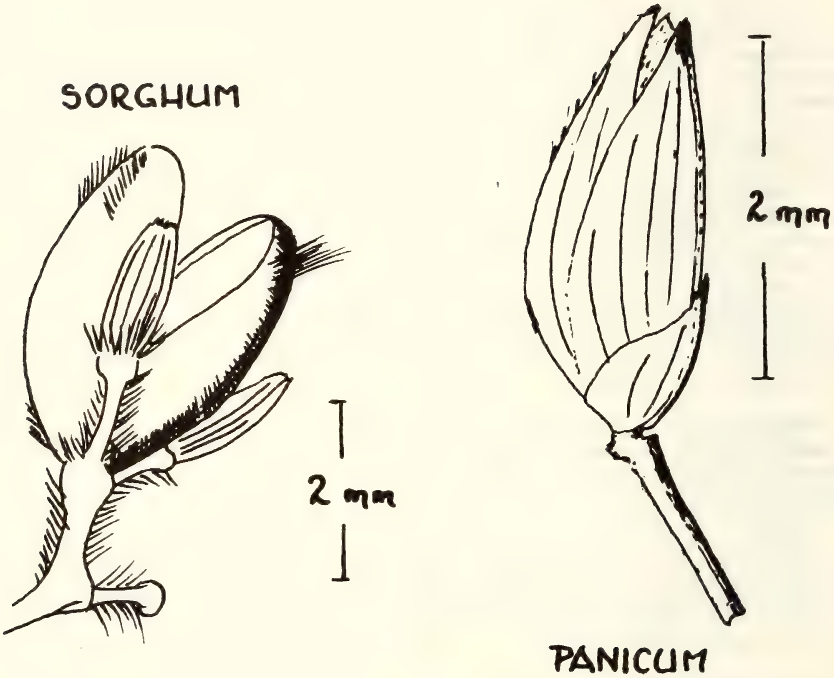
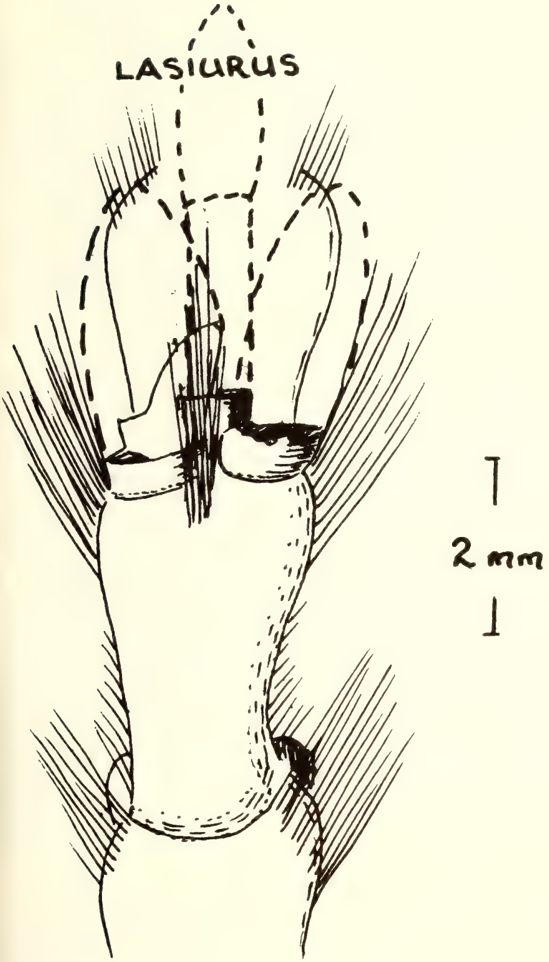
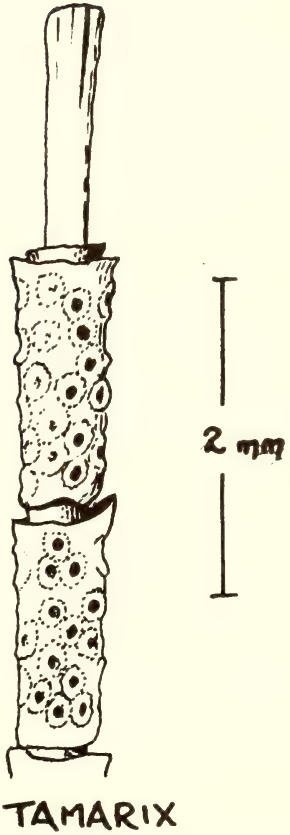

SORGHUM
2 mm
2 mm
PANICUM

Figure 1. Plant fragments
from the Bristol Mummy.


LASIURUS
2 mm


2 mm
TAMARIX

Tamarix articulata Vahl. "Thlaia" is a tree of the Sahara. It is particularly common in sandy wadies and may reach large size in more moist wadies. Soils in these are mostly saline. The fragment which I recovered shows the characteristic features of the ensheathing leaves, on which salt glands are conspicuous.

Panicum repens L. This is a cosmopolitan grass of the tropics and subtropics, particularly on stream, river and canal banks. It grows to about 1 m from a spreading rhizome and has small spikelets (2-3 mm long) in which the glumes are very unequal in length. None of the spikelets found was in a fruiting state.

Sorghum vulgare Pers. A cereal grass which has a very long history of cultivation, and is now known in many varieties. The chestnut-brown glumes of the fragments recovered are mostly attached to the remains of inflorescence branches but all appear to have fruited and shed their fruit. This would suggest ssp. bicolor (L.) Maire & Weiller. Being of probably cultivated origin, and therefore having possibly been stored, the post-fruiting nature can not be relied upon to indicate the time of year of the embalming. The great interest of these fragments is that they are of ancient origin and may reveal something about the evolutionary changes undergone by modern cultivated lines.

Lasiurus hirsutus (Forsk.) Boiss. A third perennial grass with a strong rhizome. Much of the reclaimed material appears to be floral parts of this grass, several pieces of leaf and a number of parts of the axis of the inflorescence. The last are typical, having two sessile spikelets in depressions, and one stalked (male) spikelet, in each joint of the inflorescence. Another feature is that the spikelets disarticulate early and this suggests that the material was late fruiting material. However, no fruit has been located.

Only the briefest attempt has been made, as yet, to locate pollen grains. A total examination would have involved a search of the entire resin-coated surface of the body and the mass of fabric from the bindings. It is more likely that the search will be confined to the "brushings", which were swept from the mummy at intervals during unwrapping, and to small samples of the wrappings.

The Swiss forensic scientist Max Frei claimed to have identified 49 species of plants' pollen on the Turin Shroud. This is a most impressive claim and I can only wonder if Har Em Ken Esi will reveal a similar amount of information.

EXTENSIVE DAMAGE TO MUMMY H7386 BY DERMESTID BEETLES

by L. STRONG

(Department of Zoology, University of Bristol)

In January 1980, staff at the Bristol City Museum decided to unwrap and dissect a mummy (H 7386) which had been in the museum since 1907. The exercise was not simply prompted by curiosity: H 7386 was showing signs of external decay, and was to be removed from display. Rather than commit the mummy to storage within the basement of the museum, it was considered likely that much interesting information could be gained about the embalming process and techniques of wrapping if the mummy was investigated. It then seemed a natural step to extend the study to clarify the medical history of the body as well as investigate any plant and animal remains associated with the bandages and body. After one year of preparations, the mummy was unwrapped in the Anatomy Department of Bristol University. This operation was carried out with considerable care by the team of museum archaeologists: any "interesting" specimens were removed, labelled and retained for examination.

I was asked to join the team in order to look at insect material, since I had examined remains from a mediaevel rubbish pit in the St Mary Redcliffe area some years ago. Frankly, I did not think that insects of outstanding interest would be found. Mummies unwrapped at Manchester University in 1979 (David, 1979) were found to harbour wood-boring beetles (Anobium punctatum), some clerids (Necrobia rufipes), and the remains of immature stages of true flies (Diptera). Furthermore, I was sure that insects could have entered the mummy at any time after burial. and that the chances of dating them were slender. On both scores I was proved to be wrong.

From their work on the sarcophagus and on a hieroglyphic on the bandages, the museum workers learned that the body was that of a man named Har Em Ken Esi who died at the age of 60 and who had been a tomb builder by trade. The mummy was in its original state and had not been disturbed and re-wrapped like the Manchester mummies. As the outer bandages were removed, my early pessimistic predictions were shattered very quickly. There were no museum beetles (Anthrenus museorum) or clothes-moth larvae (Tineola bisselliella). Although the wrappings were friable and showing deterioration, this was not due to chewing hexapods. However, after several layers of bandages had been removed, a single beetle elytron was found. Then two perfectly preserved brown beetles, some 8 mm long, were taken from a fold in the wrappings. These proved to be Dermestes frischii, from which I was able to identify the solitary elytron mentioned above.

This species is cosmopolitan in distribution and is recorded as being very common in grocers' shops in modern Egypt! (Hinton, 1945). They have been found previously in mummies (Lesne, 1930), and have been associated with decaying human remains at the third stage of decomposition (de Stephani, 1921). They live on dead animal tissue of almost any variety, and can pass through a complete life cycle (from egg to adult) in 5 weeks (Hinton, 1945).

As the archaeologists removed the inner bandages, the small brown beetles appeared in increasing numbers. One haul from the region of the neck yielded 49 specimens. More were found around the arms, legs, and the feet. It was also noticeable that the inner wrappings bore the marks of insect activity: galleries and holes were very common. The new samples showed that another species (D. ater) was present also. This insect resembles D. frischii in most aspects of its behaviour.

By now, I was very interested and excited by the findings. Since there were no signs of insects in the outer bandages, and since there were no signs of insects boring from the outside, the beetles collected from the inner regions must have emerged from the body of Har Em. Since we know that the mummy was not disturbed and wrapped again, these beetles were as old as the mummy itself, that is some 3000 years. These deductions were confirmed when the body itself was revealed. Insect damage was extensive due to the feeding activity of the larval stages of these dermestids. The body itself had been coated with a pitchy resinous material which had not prevented the insects from eating it and boring through it. Many parts of the body were perforated with "flight holes" of the emerging adults. The arms, legs, feet, and neck had been consumed to a large extent. Thigh muscle had been removed, leaving the femur protruding from the remaining stump of muscle which bore an uncanny resemblance to a piece of oak that had been infested heavily with death-watch beetle (Xestobium rufovillosum).

Curiously, the embalmers had subjected the arms and legs to a cosmetic treatment of sorts, using a brown packing substance. Examination of part of this showed it to be a region of great insect activity. Under the microscope, these areas of the legs proved to be a compacted mass of the ribbon-like faeces from the larvae, and a tangle of cast larval skins. As an entomologist, I do not think I have ever seen so much insect material packed into such a small volume. The larval skins were those of D. frischii and D. ater. With the exception of one carabid (like Calisoma sp), no other insects have been found - not a trace of dipteran larvae. There are, however, a great many samples yet to be examined.

We do not know the sequence of events leading to the finds in this mummy. Did the embalmers realise the damage insects could inflict, and was their work an attempt to prevent insect damage? With the limited information I have so far, I think that adult dermestids laid their eggs in the carcass of Har Em as it lay drying in the heap of natron. The larvae eat dry animal material and de Stephani (1921) states that they are found in human remains during later stages of decay. Perhaps the damage to the legs and arms caused by the larvae was so bad that the embalmers tried to make good the appearance using the packing material mentioned above. On the other hand, the packing material might have been applied routinely to make dried and shrivelled limbs appear more wholesome. Once Har Em had been bandaged, the larvae fed and developed into adults, with a good supply of food, and free from predators. Many of the adults left the body, bored into the bandages where they pupated and died, unable to leave. Some would mate, enter the body again and oviposit, keeping the infestation going. The absence of dipteran remains is due, I assume, to their having visited and left the body earlier, coupled with the highly predaceous nature of dermestid larvae.

There is yet another problem concerning the ultimate fate of these insects. There were large regions of flesh still available, and since the larvae do not require an intake of water, it could not have been desiccation that eventually controlled their activity. Perhaps the chemicals poured on the skin had insecticidal properties which caused the slow killing of the beetles. Unfortunately, we may never know the answer to this 3000-year-old ecological problem.

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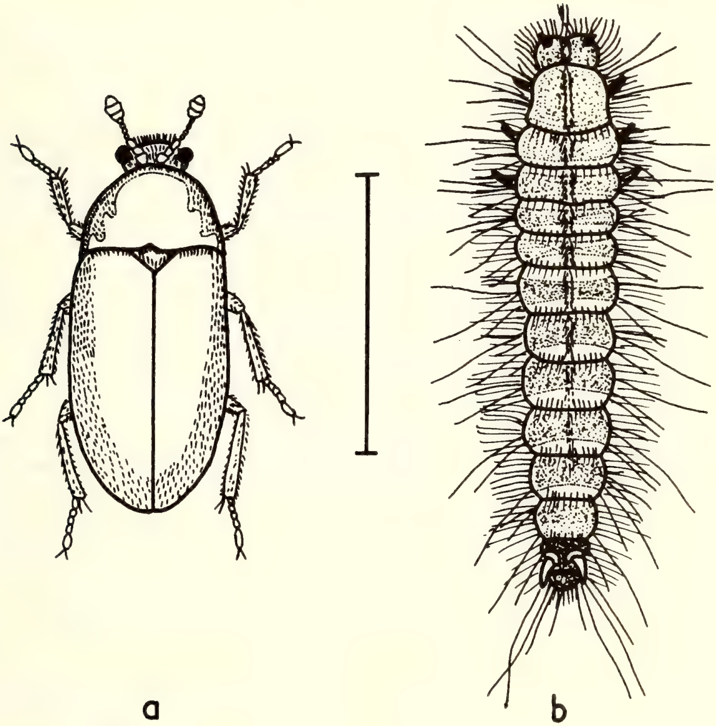

Adult (a) and mature larva (b) of Dermestes frischii. Scale line represents 5 mm. The paired appendages (urogomphi) on the 9th abdominal segment of the larva are very important in identifying the larvae. In many specimens from the mummy, the head capsule and legs (other valuable taxonomic features) were missing.

THE RHAETIC-CARBONIFEROUS LIMESTONE UNCONFORMITY AT SOUTHFIELDS QUARRY, CHIPPING SODBURY, AVON

by M.T. CURTIS

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SUMMARY

A section of Rhaetic rocks described from Southfields Quarry, Chipping Sodbury is discussed and related to similar sections previously described from the same area. It is concluded that depositional features observed suggest that the basal Bone Bed was deposited from a primary accumulation of vertebrate remains migrating over the floor of the Rhaetic sea.

INTRODUCTION

On two occasions this century, the Rhaetic-Carboniferous unconformity has been exposed and described in the Chipping Sodbury area. The first of these was when Vaughan and Reynolds (1904) described the Rhaetic of the South Wales direct railway line. This section was re-examined in 1975 whilst the line was temporarily closed and all of the Mesozoic sediments were found to be heavily overgrown.

Reynolds (1938) described the Rhaetic sediments from Barnhill Quarry, immediately north of Chipping Sodbury. Recent examination of this locality shows that nearly all of the features described by Reynolds have been quarried away or are heavily overgrown. Isolated patches of Bone Bed remain fixed to the Carboniferous Limestone erosion surface.

The most recent exposure occurred at Southfields Quarry situated 1.5 km north of Chipping Sodbury. All three exposures are on the same line of strike and so show the same sequence of Palaeozoic rocks. Recent development of the quarry eastwards has exposed the Lower Cromhall Sandstone, Clifton Down Mudstone, Gully Oolite, Black Rock Limestone and Dolomite and Lower Limestone Shale. Stripping of overburden created exposures of Rhaetic rocks lying on the erosion surface. The Rhaetic succession was exposed in two separate areas of the quarry, in the west in the access cutting to the new development, overlying the Lower Cromhall Sandstone and Clifton Down Mudstone and in the east overlying the Lower Limestone Shale. The Rhaetic cover over the intervening area has been eroded away.

The exposures described here were recorded during the course of quarry development. As a consequence, none of these exposures is still visible but it is hoped that further development will create more in the future.

RHAETIC DEPOSITS

(a) Bone Bed

The Bone Bed was found at both exposures and was located in quite clearly defined situations. The exposure in the western part of the quarry is shown schematically in Fig. 1.

The Lower Cromhall Sandstone formed a prominent ridge projecting approximately 3 m above the general level of the erosion surface. Behind this, a mudstone bed had been eroded to produce a trough 1 m deep. Sandstone boulders eroded from the ridge had filled the trough and were banked as a scree against the ridge. Bone Bed material lay in the interstices between these boulders forming a very coarse conglomeratic phase.

Isolated boulders sat further east along the erosion surface, some with Bone Bed attached. Characteristically these boulders had a flat under surface and a well-rounded upper surface.

In addition to this very coarse conglomerate, finer Bone Bed deposits were found further along the erosion surface. The Clifton Down Mudstone consisted of a sequence of alternating limestone and calcareous mudstone. Differential weathering had formed depressions in the erosion surface above the mudstone and the Bone Bed was found to fill these depressions.

At the eastern exposure, the erosion surface dipped steeply beneath the Rhaetic cover. This inclined surface reflected the softer lithologies of the Lower Limestone Shale. The Bone Bed here occupied depressions in the erosion surface analogous to those above the Clifton Down Mudstone sequence but exposure was limited since the shales represent the eastern limit of economical quarry working.

The Bone Bed consisted of a conglomerate phase cemented by calcite with a predominantly grey colour when unweathered. The clasts were almost entirely less than 10 mm in diameter with very few exceeding 40 mm except in the eastern exposure where a greater concentration of larger limestone clasts was found. The clasts, both organic and inorganic, showed a very high degree of abrasion and rounding with the exception of a small percentage of vertebrate remains which showed little or no sign of wear. Of the inorganic clasts, the vast majority were limestone and quartz with subordinate amounts of a buff coloured mudstone.

The vertebrate remains so far identified include the following:-

PISCES

Chondrichthyes

Acrodus minimus (very abundant)
Hybodus minor
Hybodus cloacinus
Hybodus sp.
Hybodont denticles
?Dalatiid denticles

Osteichthyes

Gyrolepis alberti (teeth and spines)
Birgeria acuminata
Saurichthys longidens
Sargodon tomicus
Ceratodus latissimus
Scales
Fin spines

Coprolites

(b) Black Shales

The black shales overlay the Bone Bed at both outcrops, the thickest sequence, recorded at the western section, comprising 1.7 m of lenticular black shales. These shales had many yellow/brown partings and in many cases the bedding planes were covered with the bivalve Rhaetavicula contorta. Above this lay a 50 to 100 mm bed of nodular grey limestone. Both the Bone Bed and the limestone were overlain by 20 mm of 'beef'. The limestone was succeeded by 100 mm of shales and the remainder of the succession was concealed by overburden.

The shales were contorted around the boulders described above and showed a drape structure (see inset in Fig. 1), which then died out supratenuously upwards. The beds were also draped against the sandstone ridge as shown in Fig. 1. All of those observed abutted against the ridge. All of the Rhaetic material on the western side of the ridge had been removed during earlier quarrying operations.

At the eastern exposure the following sequence was observed:-

Bed No.	Thickness mm	Description
4	750	Blocky black mudstone and shales
3	30	Pyritiferous limestone
2	250	Lenticular black shales with many fossiliferous beds
1	100 seen	Fissile unfossiliferous paper shales with brown partings

The fossiliferous beds were largely monospecific in their fossil content which comprised mainly Rhaetavicula contorta. In addition to the invertebrates, a number of Gyrolepis scales and odd small bone fragments were found at both sections.

Where black shales had been tipped after stripping as overburden, a large piece of shale was obtained showing large intersecting worm burrows up to 25 mm in diameter.

DISCUSSION

The exposures described are inferior to those previously recorded from the area in that the shale sequence is much attenuated, indeed totally removed from much of the erosion surface. However, the Bone Bed is well developed and its relationship to the lithology of the underlying rocks was clearly seen.

The clasts in the conglomerate can broadly be divided into two groups. Those exceeding 40 mm were all of local derivation. All clast lithologies in this range could be attributed to Palaeozoic rocks outcropping within a few metres of their position in the Bone Bed. The scree observed banked against the Lower Cromhall Sandstone agrees well with that observed by Reynolds (1938) in Barnhill Quarry. The flat-bottomed boulders have been eroded *in* situ since any transport would have resulted in an even rounding. It is possible that this occurred through aeolian erosion prior to the Rhaetic transgression.

The smaller clasts were nearly all of vertebrate material except for a few well rounded quartz grains. This, with the highly abraded character of most of the vertebrate remains, indicates a moderate and sustained current regime which carried a bed load of finer material and deposited it in the lower energy areas such as depressions in the sea floor and interstices between locally derived boulders already present on the sea floor.

Sykes (1977) discussed criteria for the classification of Rhaetic Bone Beds into primary and secondary deposits. The present description agrees well with his secondary deposits, i.e. moderately well sorted, fossil fragmentation and abrasion. Well preserved fossils with fine detail, even a small percentage, do still suggest, however, that there was contemporaneous deposition of primary material. This, with the fact that depostion occurred in depressions in the erosion surface suggests that the vertebrate material accumulated as a lag-type deposit from fairly rapidly flowing water at a time when terrigenous input was at a minimum. The flow was insufficient, however, to transport the sandstone boulders far from their source.

Antia (1979) refuted Sykes' classification since, he argued, in a high energy environment, secondary characteristics could be superimposed on a primary deposit. The fact that the sandstone boulders have not been moved far precludes the possibility of a high energy deposit. The apparently continuous input of vertebrate material, however, indicates that deposition occurred from a primary accumulation of remains which was constantly moving over the sea floor.

The description above accounts for the presence of both primary and secondary features. It has also shown that the conglomeratic nature of the deposit may be misleading when discussing the origin of the Bone Bed.

ACKNOWLEDGEMENT

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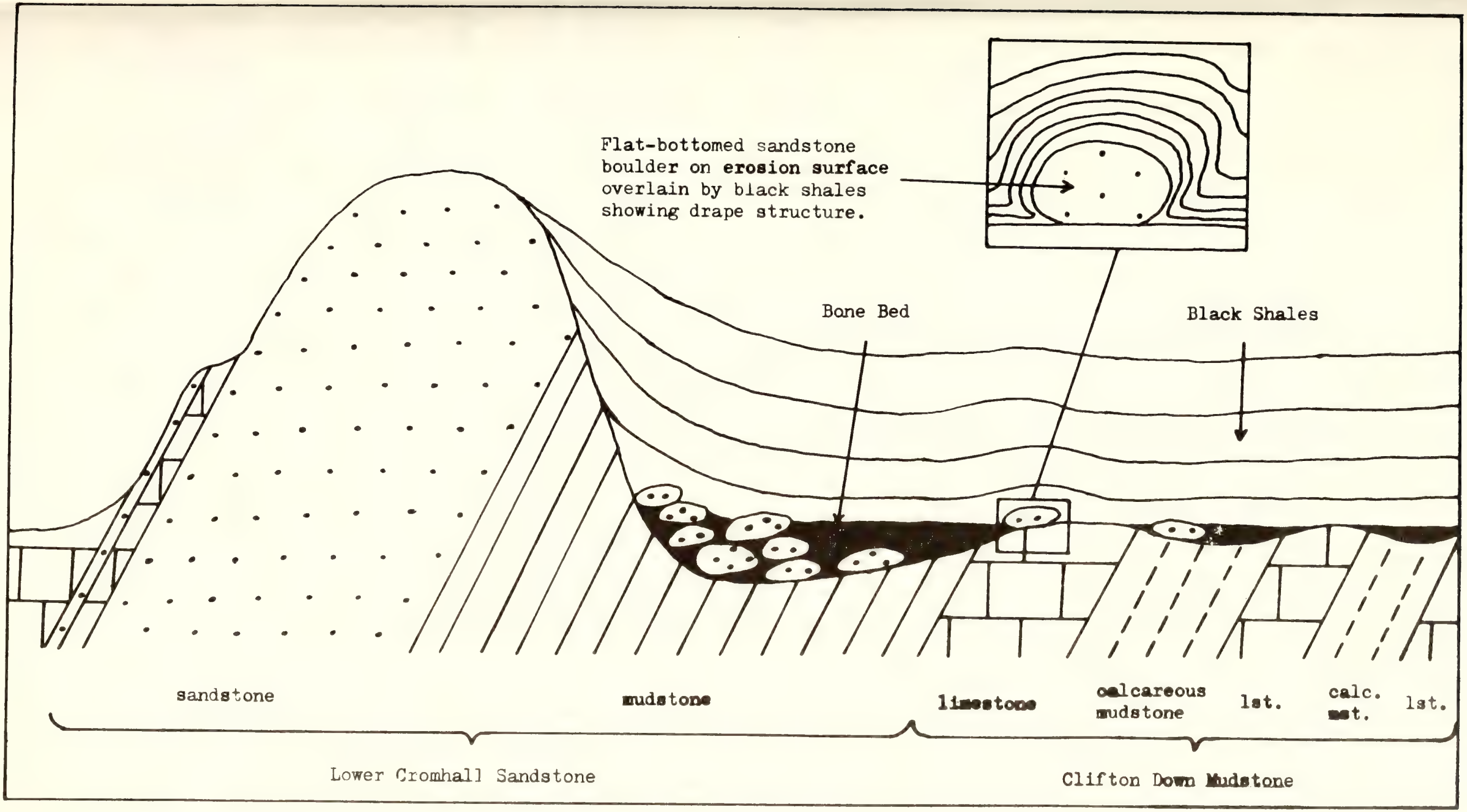
Flat-bottomed sandstone boulder on **erosion surface** overlain by black shales showing drape structure.
Bone Bed
Black Shales
sandstone
mudstone
limestone
calcareous mudstone
lst.
calc. mst.
lst.
Lower Cromhall Sandstone
Clifton Down Mudstone

Fig. 1 Relationship of Rhaetic sediments to underlying Palaeozoic rocks in Southfields Quarry, Chipping Sodbury. (schematic)

THE MINERALIZATION OF SOUTHFIELDS QUARRY, CHIPPING SODBURY, AVON

by M.T. CURTIS

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SUMMARY

The mineralization of Southfields Quarry, Chipping Sodbury, is described in this paper. Sphalerite - galena - barite - pyrite mineralization is described from a fault and joint system in the Clifton Down Limestone and disseminated galena described from the Rhaetic shales. The fault and joints are related to similar structures occurring in the Cotswolds and post Middle Jurassic age is ascribed to the mineralization.

INTRODUCTION

Because of its importance in the historically recent past, the heavy metal mineralization of the Mendip Hills has received considerably more attention than that found in the North Bristol Coalfield and has recently been discussed by Green (1958) and in more limited aspects by Alabaster (1976).

So far as is known, no description of the mineralization north of Bristol exists except for the reported occurrence of amethyst and sphalerite from the Triassic evaporite deposits of Yate (Curtis, 1974) indicating the existence of post-Triassic hydrothermal mineralizing activity. The bulk of the mineralization is observed in the Carboniferous Limestone, since here may be found the largest exposures in the form of currently working quarries. The Carboniferous Limestone outcrops as an arcuate, elevated ridge passing north from Chipping Sodbury, to Cromhall where it passes south-west to Tytherington and Almondsbury. Southfields Quarry is situated 1.5 km north of Chipping Sodbury on the eastern edge of this exposure.

Southfields Quarry was opened in the Clifton Down Limestone whilst present development has extended it eastwards into the Gully Oolite and the Black Rock Group. The intervening Lower Cromhall Sandstone and Clifton Down Mudstone are exposed in the cutting and tunnel which join the two quarries. The regional dip is 30-40° to the west.

FAULT MINERALIZATION

At the eastern extremity of the quarry, a sinistral wrench fault with a strike of 290° was seen in the south face of the access cutting to Hampstead Farm. This fault had a strike slip of 2.4 m and displayed curvilinear faces. The fault plane was vertical and showed heavy slickensiding which plunged at 10-12° to the west. The exposed erosion surface above the fault at this point showed a downthrow of 300 mm on the north side of the fault.

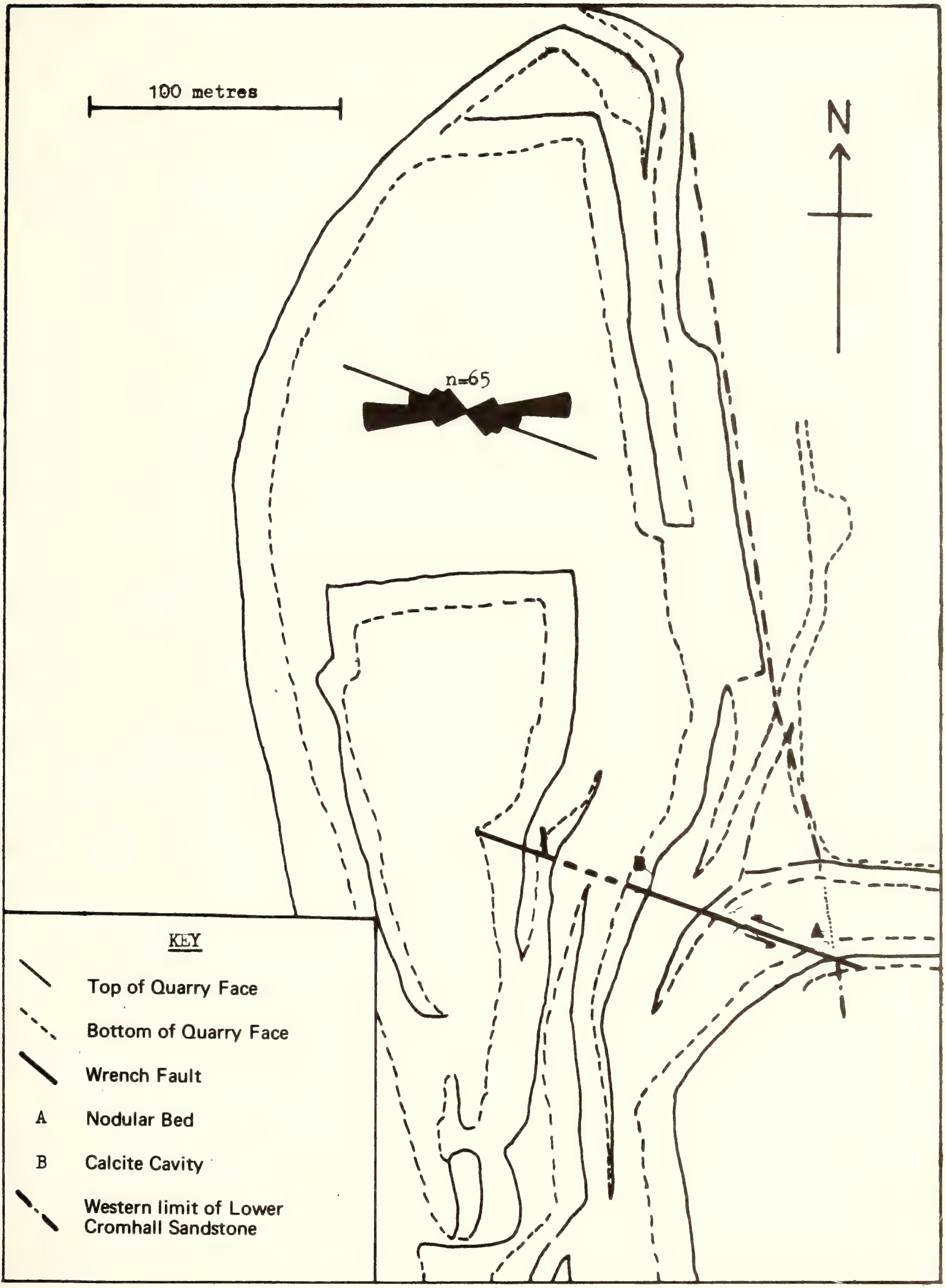

100 metres
N
n=65
A
B
KEY
Top of Quarry Face
Bottom of Quarry Face
Wrench Fault
A Nodular Bed
B Calcite Cavity
Western limit of Lower Cromhall Sandstone

Fig. 1 Southfields Quarry showing the setting of the Zn - Pb - Ba - Ca mineralisation. The rose diagram depicts the orientation of mineralized joints (15° class interval.)

This fault could be followed along its strike for 125 m (see Fig. 1) as far as its intersection with the eastern wall of the third level. It could not, however, be detected in the western wall of the quarry. 18 m south-east along the fault, a small spur joined the main fault with a strike of 341° indicating that the fault may have been dying out in this area.

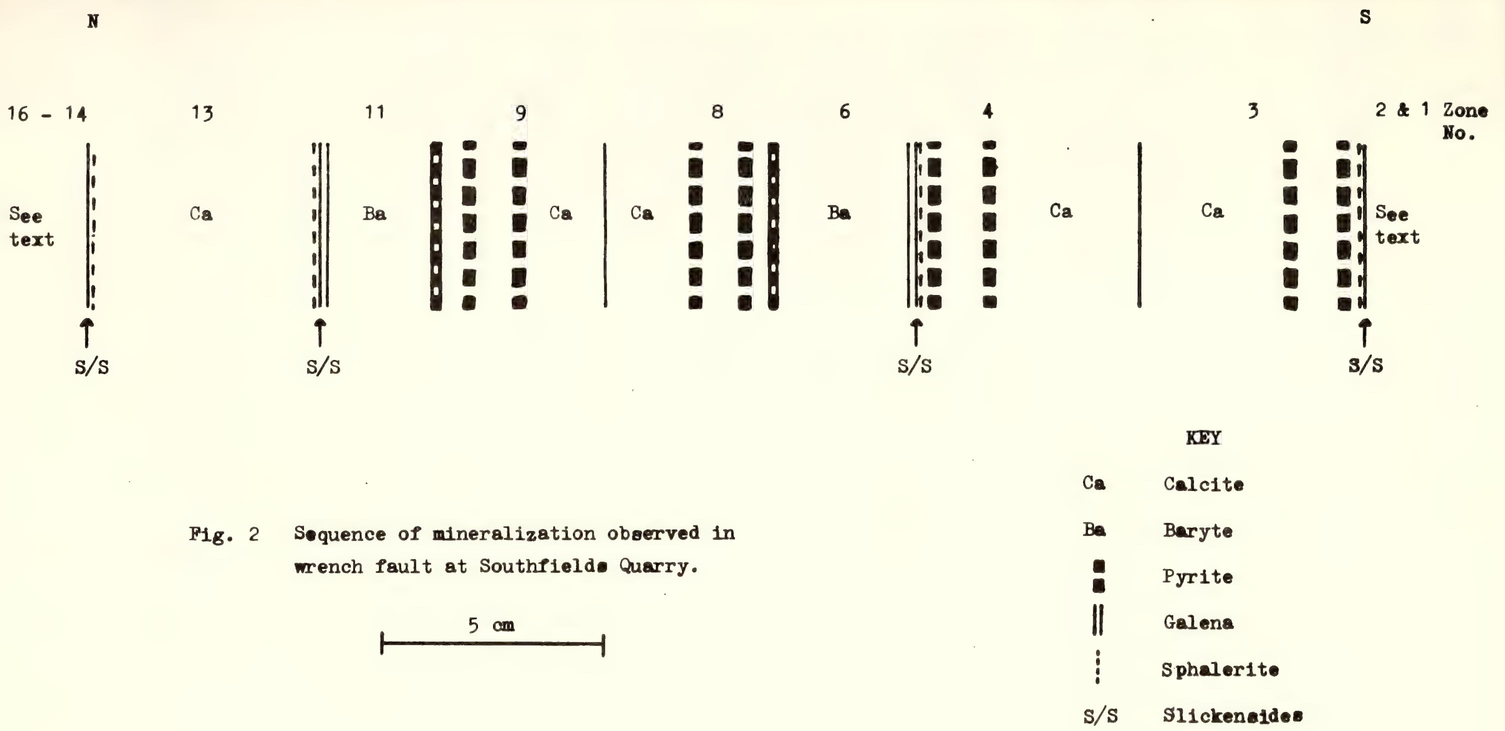
The lateral movement of the fault combined with its curvilinear faces caused pinching and swelling leading to the development of a series of small chambers along its length joined by constricted passages. These chambers had subsequently been infilled with extensive lead, zinc and barium mineralization.

Along the length of the fault a mineralized fault breccia was formed. The clasts were surrounded by concentric rings of sphalerite and calcite or, more commonly, galena followed by alternating white, grey and pink barite, the interstices in all cases were filled with calcite. Pyrite occurred at all stages of the mineralization. The limestone clasts showed varying degrees of recrystalization and frequently showed small veinlets of galena or pyrite or irregular patches and isolated crystals of either.

More typically, a symmetrically banded mineralization occurred which was observed at several stages in the development of the quarry. A typical section across the fault is shown in Fig. 2. The section was divided into segments bounded by slickensided surfaces. These slickensides plunged at about 10° to the west. Brecciation of the central galena-barite sequences was common throughout the fault with fractures filled with secondary barite.

Zones 2 and 14 both consisted of fault breccia with clasts of buff and grey limestone to 200 mm set in a calcite matrix. Pockets of red and green clay were common as was a heavy red staining. These zones were typically 300 mm thick on the north side and 150 mm thick on the south. Zone 15 was a 900 mm thick band of decalcified soft black limestone with pockets containing scalenohedral, doubly terminated calcite crystals associated with pyrite displaying a combination of cubic and octahedral habits. In this zone, oosparites were leached giving a porous spongy rock whereas biosparites were reduced to a black mud leaving individual Lithostrotion coralites preserved. Zone 16 was transitional betweeen zone 15 and the country rock. Recrystallization of limestone was extensive in zones 2 and 14. At their largest development along the length of the fault observed, zones 5 and 12 reached a width of 400 mm. The sphalerite-calcite sequence was often absent.

Sphalerite and galena most often occurred as anhedral bands and only rarely did galena occur as groups of crystals showing a combination of the cubic and octahedral habits. This combination was also shown by the pyrite encrusting calcite in small cavities. Cubes to 6 mm in length were more rarely found. The pyrite usually occurred as anhedral masses between adjacent calcite crystals. Isolated cubes of pyrite up to 2 mm in length occurred in the green mud found in the mineralized sequence and also in green mud found filling some of the joints elsewhere in the quarry. The barite displayed radiate crystalline structure arranged roughly perpendicular to the wallrock, but where it had grown around an object, a mammillary form was displayed. This structure was normally found in a solid, banded deposit but in a number of small isolated cavities, patches of isolated, fibrous crystals occurred having a felt-like texture. Furthermore, in some small cavities, cockscomb arrays of barite crystals to 4 mm in length dusted the surface of scalenohedral calcite.


N
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16 - 14
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Ca
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Ba
Ca
Ca
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S/S
S/S
S/S
S/S
5 cm
KEY
Ca Calcite
Ba Baryte
Pyrite
Galena
Sphalerite
S/S Slickensides

Fig. 2 Sequence of mineralization observed in wrench fault at Southfields Quarry.

The small spur to the north of the main fault showed the same mineralization as described above except that the wallrock alteration was not so extensive.

BEDDED NODULES

During the excavation of the access cutting to Hampstead Farm, a bed of nodules was uncovered approximately 5 m north of the main fault line. This bed, which lay immediately above the uppermost sandstone bed of the Lower Cromhall Sandstone was 350 mm thick with individual nodules up to 100 mm in diameter and was overlain by the lowermost bed of the Clifton Down Limestone. The joint face on which all these beds were exposed had an east-west strike and was covered with a thin veneer of galena and barite.

The nodules were grey to green in colour with calcite scalenohedra on their outer surfaces. In section, a number of these nodules had a core of clear calcite surrounded, in one specimen studied, by an intimate mixture of barite and celestite but not a solid solution of baritocelestite.

Prior to the excavation of this cutting, buff coloured nodules up to 500 mm in diameter were obtained from a scree 5 m north of the exposure described above. These nodules were round to oblate and also had small scalenohedral calcite crystals on their exterior. Occasionally, several nodules were fused together forming ballstone-type masses. The individual nodules frequently had an indentation in their base and in section displayed a radiate crystalline structure with a buff to pink colour. Some showed a concentrically arranged colour banding, the origin of which was at or near the centre of the nodule whereas in the case of the indented nodules, at or near the apex of the indentation. The radiate colour banding in all cases included a grey to black band about 3 mm wide shown by microchemical testing to be galena. A typical nodule is shown in Fig, 3.

The corresponding part of the lithological sequence on the south wall of the cutting showed no evidence of this nodular development. This Lower Cromhall Sandstone gave way to the sequence of sandy micrites and shales found in the lower part of the Clifton Down Limestone.

The nodular bed was only seen in situ briefly during the development of the cutting prior to the discovery of the fault. The relationship of the beds to the fault and any variation with depth could not therefore be studied.

TUBOSE PYRITE

At an earlier stage in quarry development, a large cavity approximately 4 m long by 2 m high was opened to the north of the main fault ('A' in Fig. 1). The cavity which lay immediately north of the fault and corresponded to zone 15 of the mineralized sequence described above was lined with scalenohedral calcite crystals to 300 mm in length. Between these crystals, masses of anhedral pyrite were found up to 150 mm in diameter.

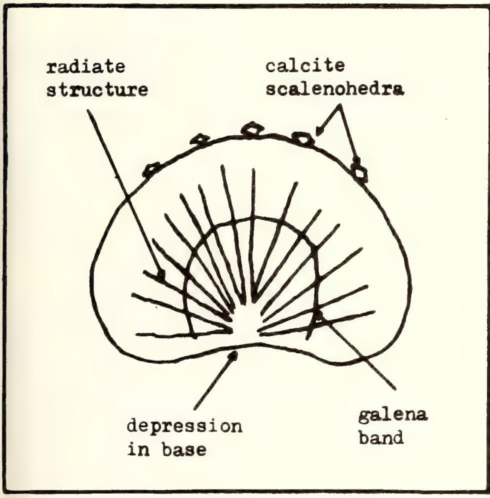
radiate structure
calcite scalenohedra
depression in base
galena band

Fig. 3. Barite - celestite nodule.

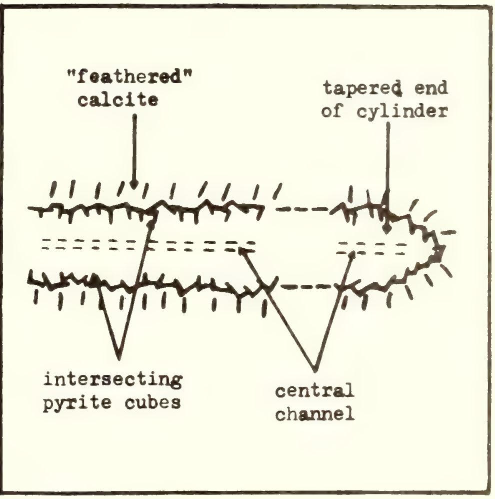
"feathered" calcite
tapered end of cylinder
intersecting pyrite cubes
central channel

Fig. 4. Tubose pyrite.

Associated with this pyrite was another variety comprising cylinders of roughly circular cross-section up to 80 mm in length and up to 14 mm in diameter. These cylinders had tapered ends at one extremity whilst the other was attached to massive pyrite. The outer surfaces comprised groups of highly limonitised, intersecting pyrite cubes up to 3 mm in length. All of the cylinders had open central tubes 0.5 to 1 mm in diameter running through them but the tubes were closed at the tapered ends. The pyrite showed a radiate crystalline structure about this central tube. The general form of these cylinders is shown in Fig. 4.

One of the massive specimens of pyrite 10 mm x 15 mm set in calcite showed a number of small needle-like outgrowths 1 mm x 5 mm. The needles had a square cross-section and tapered ends showing octahedral faces.

The cylinders and cubes of pyrite had grown through large crystals of calcite exploiting cleavage planes. The calcite at its interface with the pyrite had a highly eroded 'feathered' appearance typical of calcite subjected to corroding solutions.

JOINT MINERALIZATION

Around the quarry, a number of joints showed heavy metal mineralization. These joints were all vertical or nearly so. The strikes of 65 such joints measured around the north and west faces of the quarrey are shown on the rose diagram in Fig. 1 (15° class interval). The strike of the fault observed in the eastern part of the quarry is also shown. Most of the joints were observed to be continuousup the full height of the quarry but where they were not, related joints in adjacent beds were connected by mineralization in the intervening bedding plane.

A number of these joints, where the wallrock could be observed, showed slickensides plunging west at angles ranging from 8° to 25° with an average of 14°.

The mineralization found in these discontinuities varied considerably. In the majority of cases where the opening was only of the order of a few millimetre coarsely crystalline calcite was often covered with a dusting of small buff to orange cockscomb barite with occasional specks of galena. In only a few cases where the degree of opening amounted to a few tens of millimetres, a complete sequence of mineralization was observed starting with calcite-sphalerite adjacent to the wallrock followed by galena-barite which again could be followed by calcite. Pyrite was a common accessory mineral particularly associated with calcite. In one or two cases, the heavy metal mineralization was emplaced between layers of red or green silty mud which was itself adjacent to the wallrock. No evidence of wallrock alteration was found along any of these joints.

MINERALIZATION OF RHAETIC SHALES

During the excavation of the cutting for the tunnel access to Hampstead Farm, the Rhaetic sediments which unconformably overlie the Carboniferous Limestone were exposed. The erosion surface was undulating at this point due to the varying limestone and mudstone lithologies and depressions in the softer mudstones and limestones contained Bone Bed deposits. Many sandstone boulders to 500 mm in diameter, rounded only on their upper surfaces and derived from the prominent Lower Cromhall Sandstone ridge, rested on the erosion surface. The succeeding black shales showed drape features where they covered prominent ridges or large clasts of sandstone.

Scattered throughout the black shales were isolated cubes of galena up to 4 mm in length. No evidence of any mineralization was found in the Bone Bed nor in the immediately underlying Carboniferous Limestone.

DISCUSSION

The fault bisecting the eastern half of the quarry represents the largest and most complex mineralized feature. The step in the unconformity suggests that movement occurred after the deposition of the overlying Rhaetic beds. The sequence of mineralization shown in Fig. 2 shows that at least two phases of movement and fluid injection occurred. After the initial movement, sphalerite was was deposited with calcite and the ubiquitous pyrite. Another phase of movement then disrupted this mineral band, displacing the fault and placing identical sequences of mineralization on opposing walls of the fault. This was then followed by the deposition of galena-barite in cavitites along the fault. A further minor phase of movement is indicated by the brecciation of this barite.

The mineralized joints observed on the western and northern walls of the quarry are clearly associated with the movement on the fault and represent pre-existing joints which were widened during this phase.

The movement and orientation of the fault are consistent with its representing a first order sinistral wrench fault produced in response to an east-west compression. Hancock (1969) produced evidence for such a regional compression following a study of the jointing in Middle Jurassic rocks in the Cotswolds. The mineralized joints in the quarry represent hydraulic extension fractures produced by this east-west compression.

The fault appears to have provided the main conduit up which mineralizing fluids passed in the area, the widened joints being fed by this main flow. The Rhaetic shales would have formed a barrier to this upward migration and ponding would have resulted beneath the unconformity. It is suggested that the galena found in these Rhaetic shales was formed by deposition of lead from the fluids by combination with sulphides in the black shales. Hamilton (1966), in discussing the origin of galena found in the Rhaetic shales of Almondsbury near Bristol, suggested that the most likely origin lay in mineralizing fluids.

The bedded nodules lying above the Lower Cromhall Sandstone suggest that fluids may have travelled up the fault and then into the sandstone. The indentations on the base of these nodules (see Fig. 3) are strongly suggestive of the ripple marks found on the sandstones. It is proposed that when these fluids passed upwards, they encountered shaley partings beneath the Clifton Down Limestone where nucleation of these nodules occurred. The concentric growth pattern with the inclusion of a galena band suggests this mode of origin. The inclusion of a calcite core in some cases leads to the possibility that the nodular bed replaces a limestone bed. The presence of celestite in these nodules indicates a replacement by strontium-bearing fluids or a local enrichment of strongtium in the depositing medium. The presence of the galena band indicates that the nodules are primary in origin.

Pyrite is found disseminated through this deposit, particularly in association with calcite. In the case of the tubose pyrite, secondary deposition has occurred at a later stage. The acid, pyrite-bearing fluids have exploited cleavage cracks in the calcite which were enlarged as pyrite was deposited. The cylindrical holes down the centre of these growths provided channels along which the acid waters flowed until they arrived at the calcite-pyrite interface. When these fluids encountered the alkaline calcite, pyrite was deposited producing a radial growth pattern around the central cylinder. The dissolution of the calcite is indicated by its eroded appearance at the pyrite-calcite interface.

It is not possible to deduce the age of the deposit on purely stratigraphic grounds. From the evidence of the step in the erosion surface, the mineralization is clearly post-Rhaetic. A post-Triassic age for hydrothermal mineralization observed in the local Keuper Marl has been proposed (Curtis, 1974) whilst a post-Inferior Oolite age has been proposed by Alabaster (1976) for Pb-Zn-Ba mineralization observed in Whatley Quarry, Somerset. This age was apparently at variance with that of 230 ± 30 Ma found by Moorbath (1962) based on lead isotope abundance studies of Mendip galenas. Since it is likely that the Whatley and Chipping Sodbury mineralization phases were synchronous, a Triassic age for the Mendip galenas must be viewed as suspect. The association of the mineralization at Chipping Sodbury with the east-west compression noted by Hancock (1969) leads to a post-Middle Jurassic age being ascribed to this deposit. This agrees well with the post-Inferior Oolite age reported by Alabaster (1976) for the Mendip mineralization.

ACKNOWLEDGEMENT

I would like to thank Mr I.H. Ford, Drs R. Bradshaw and P.L. Hancock for helpful discussion during the course of this work, and Mrs J. Rowland for typing the manuscript. I would also like to express my thanks to the management of A.R.C. Southfields Quarry for their co-operation.

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AVON BIRD REPORT, 1980

COMPILED BY THE EDITORIAL COMMITTEE,
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EDITORS

J.D.R. Vernon retired from the Editorial Committee after seven years' service. We welcome B. Lancastle in his place. We are again indebted to G.E. Clothier for meteorological information and to G. Sweet for specialist advice.

THE YEAR

THE YEAR

The year opened cold, with night temperatures in Avon of -7°C on the 2nd. The 3rd was suddenly milder, with a maximum temperature of 11°C locally, but the month as a whole was cold, though dry and sunny. The rainfall was largely on a few wet days in the third week. Easterly winds prevailed for much of the month and brought snow or freezing rain, chiefly to the eastern parts of Britain, but the cold was not sufficiently intense to produce any considerable weather movements. Locally there were snowfalls from the 13th to the 15th, when some seventy Bewick's Swans joined the 300 or so already at the Wildfowl Trust (WT) at Slimbridge, Glos. The Whitefronted Goose flock at the New Grounds, Slimbridge, was only some 1,500 strong, and very few wandered into Avon. During the first half of the month some 150 Ruddy Ducks joined the flock at Chew Valley Lake (CVL). Shoveler numbers in the county did not exceed 100, although 500 had been present in December 1979. Wigeon numbers, however, were about twice those in December.

On 31 January a depression brought cold and snow blizzards to the north of the country, but mild, wet weather to the S.W., an introduction to a February that was the mildest for many years, especially in its second and third weeks: temperatures rose to over 13°C on the 17th at Filton and Long Ashton. In the mild weather, the majority of the Wigeon, Teal, Mallard and Pochard flocks had dispersed by the middle of the month, though the Tufted Ducks remained. The Greater Sandplover which had provided the sensation of the previous autumn at CVL was last seen on the 10th. Several parties of Mediterranean Gulls were reported in the south of England; at least two birds reached CVL.

March opened with a short cold but sunny spell, with winds from W to N, aiding the departure of winter visitors. Then came unsettled weather, with gales on the 6th. A depression on the 17th gave a little snow next day, and a spell of cold easterly weather which delayed the arrival of spring migrants. The month as a whole was dull, wet and colder than normal. The first local transatlantic vagrant of the year was a notable one - the first Ring-billed Gull recorded in Avon was found at CVL on the 22nd. The species is plentiful in N. America and winters on the east coast, but the first European record was only in 1968; the first for Britain and Ireland was one in Swansea Bay in March 1973.

After heavy rain on 1 April, dry bright weather came as a 'high' moved NE from the Azores, its circulation opposing the flow of spring migrants. Only when its centre reached W. Europe on the 11th did a few days of southerly winds bring spring migrants in any numbers. A sprinkling of Hoopoes from Ireland to Kent included three seen in Avon, and on the 16th the county's first Savi's Warbler was reported from CVL. A few early Black Terns were noted at the reservoirs in the same period. At St George's Wharf both Ringed and Little Ringed Plovers appeared: both had bred there in 1979 and the former did so again. From the 19th a period of northerlies again slowed down migration, and the month ended with some days of showers.

May started with cold NE winds, which moved to the S and E on the 7th, bringing the great bulk of delayed migrants. There was another small passage of Black Terns and a marked one of sea terns (mostly Arctic), noted at the reservoirs and on the Severn shore. The flood of migrants included a Red-throated Pipit seen at the New Grounds - Gloucestershire's first. Dry, sunny and warm weather continued, with a few showers around the 20th, until unsettled weather in the last days of the month and heavy rain on the 31st ended what had threatened to become a drought.

On spring passage no Little Stints were seen, only one Curlew Sandpiper and very few Knot, but there were more reports, and slightly larger numbers, of Whimbrel than in recent springs. On 31 May a Sandwich Tern (infrequently seen here in spring) was at the Axe Estuary.

June started with a fine hot spell, broken in most of the country by thunderstorms. A small movement of Common Terns was noted on the coast. On the 13th came a change to dull, cold and showery weather, with occasional hail and thunderstorms, and the month ended with strong winds and heavy rain. The breeding success of at least the smaller passerines must have been reduced. Unusual events were a brief visit to CVL by a Black-necked Grebe and the summering there of a female Ring-necked Duck and a female Goosander. Several Garganey summered too, but did not breed. Three pairs of Shoveler, four of Pochard and two of Ruddy Duck bred at CVL. Of the more numerous and regularly breeding water birds, Mallard had a good year but Tufted Duck broods were only a little over a third as many as in 1979. Great Crested and Little Grebes had record or near-record breeding seasons, and Coot also did well. On the coast, Shelduck produced about 40% more young than in 1979. A small party of feral Greylag Geese again built up at CVL in May and June, staying until September.

The cool, unsettled weather continued for the first three weeks of July, with much rain and cloud. The south-west suffered less than the rest of the country but had a cool, wet second week with N to NE winds, perhaps explaining the presence at the Yeo Estuary of a Redshank marked earlier in the year at the Firth of Forth. From the 15th there was a short warm spell with winds from the west in the Bristol Channel as an anticyclone moved SE from a position off the south-west of Ireland. On the 17th two Gannets and on the 19th a Fulmar and several Manx Shearwaters were noted off the north Avon shoreline.

From 21 July an anticyclone over Germany gave sunnier, warmer weather with winds from an easterly point, interrupted by occasional thundery periods, with heavy rain in eastern Britain. The month was the coolest July since 1965. General rain on the 29th preceded a few fine days with S to SW winds and occasional rain. The next two weeks were warm and changeable with mainly SW winds and some showers. The south avoided some periods of heavy rain, and was drier than average. August came to an end with a fine week in the south except for heavy rain on the 28th and 29th. Westerlies, sometimes very strong, dominated the first half of September; there were violent gales in the north from the 11th to the 13th. The south was shielded from most of the effects of these by southerly air from an anticyclone moving over France to Germany.

The August and early September westerlies brought their crop of transatlantic wanderers. At least fourteen Wilson'sPhalaropes were reported to British Birds; one, the fifth recorded in Avon, was at CVL for ten days from 13 September. There were also numbers of Pectoral Sandpipers, and two of these were at CVL for some three weeks from 30 August. Buff-breasted Sandpipers were the most numerous arrivals; one was reported from CVL and one from Cheddar Reservoir, Somerset. Another species to arrive in some numbers was the Sabine's Gull, of which over twenty were noted off the Irish coast. On the west coast of Britain from one to three were reported on 13 September from the Wirral, Bardsey and St Ives, and in the Bristol Channel from New Passage, CVL and Steart. Next day one was at the Axe Estuary, and later in the month others were at Weymouth and Portland. The three Avon records (two at least of which might have referred to the same individual) follow five others this century in the area, all since 1954.

The westerlies also produced records of storm-driven sea-birds, with both Arctic and Great Skuas and Gannets at the end of August, and Gannet, Fulmar and Manx Shearwaters around 10-14 September. One of the latter species, picked up inland, found its way to CVL through the intervention of the local veterinary surgeon. On 30 August and 19 September flocks of 50 and 65 Knot were in the Weston-super-Mare area; these are large numbers for Avon nowadays. On 20 and 21 September several Sandwich Terns were at Blagdon and Chew Valley Reservoirs, and on the 21st the peak of the autumn passage of Common and Arctic Terns passed through Barrow Gurney and Blagdon Reservoirs.

From 19 September there were several thundery days, which gave way in the south to more dry, warm though sometimes cloudy weather with strong westerlies. This continued into the early part of October, while there were severe gales in the north. On the 6th, heavy rain and strong NW winds heralded an unsettled period with the first autumn frosts. Grey Phalaropes appeared in the Axe Estuary and at CVL on the 9th, and a Leach's Petrel was seen near Severn Beach the same day. On the 11th another Sabine's Gull record came from Sand Point, and on the 12th a Common Scoter was seen at Barrow Gurney Reservoirs. On the 12th, too, the first Bewick's Swans of the season reached the Wildfowl Trust - the earliest recorded first arrival, doubtless brought about by the hard weather prevailing in Siberia and northern Europe, and the strong winds.

After westerlies on 13 and 14 October the NE winds returned and the south was wet and cold. From the 20th southerly winds moved up through the country and the south became very mild; it was wet, but escaped the torrential rain that fell further north. The month ended brighter but cold. On the 24th a Brent Goose was off the Clevedon coast and on the 26th a Long-tailed Duck reached Blagdon Reservoir, as did two Red-breasted Mergansers. On the 25th, seventy Kittiwakes were seen over CVL, a large number to be seen inland. At various times in September and October, and at the beginning of November, Shags were noted on the coast and at CVL.

On 19 October four Barnacle Geese were observed first in the Yeo Estuary and then over Sand Bay. They called to each other a great deal, and are considered to have been genuinely wild birds. Most of the Barnacle Geese seen in Avon are considered to have escaped from collections (see the list at the end of this Introduction). At the time of this record, Barnacle Goose flocks were moving into Britain and were widely scattered over the country by the gales (M.A. Ogilvie, personal communication).

In early November easterlies brought very cold air and night frosts; snow fell from the 4th to the 7th, but no appreciable amount fell in Avon. By the 9th the wind had moved to the north and the weather was less cold. From the 14th fronts moving east brought gales and rain, with much higher temperatures in the south. The cold returned from the 25th and many areas, though not the south-west, had snow on the 28th. The last two days of November were cold and bright, with very high pressure on the 30th.

Bewick's Swans reached the Wildfowl Trust in some numbers from 1 November onwards, and by the 12th 212 were present, a large number for this comparatively early date. Some parties moved into Avon, and one group remained at CVL until nearly the end of the year. The first Whitefronted Geese of the winter also arrived during the month but numbers were small and few were seen in Avon. Wigeon, Pochard and Shoveler moved in good numbers to the reservoirs early in the month, though many Shoveler had left by the end, as had most of the Gadwall. A Mandarin drake visited CVL from the 16th to the 30th; normally we regard birds of this species as having escaped from captivity and list them accordingly, but this may have been a feral bird since others appeared in Cheshire, Warwickshire and Leicestershire at about this time, which could indicate the dispersal of a feral flock.

In the first week of December two cold fronts moved south over the country, with snow and hail in the north (though the south was dry) and widespread night frosts. On the 8th the wind moved to the SW and by the 10th the south was milder, with some rain. Showery, cooler weather followed, with a hard frost on the 15th/16th. Snow fell in the north. On the 23rd the weather was very mild, but the cold returned next day and on the 26th snow fell on high ground in Wales and the south. The month ended with strong westerlies. There were influxes of Teal and Ruddy Duck at the reservoirs and Shoveler numbers fell further. A Smew at CVL on the 10th was the only one recorded during the season. On 28th December a Goosander was off Clevedon.

COMMON BIRDS

There were more Sand Martin breeding records than usual - though in Avon the title "common" is far from justified for this species. The Rookery survey done as part of the B.T.O.'s national census showed some effects of the loss of elms, formerly the most-used nesting tree species. A search for Yellowhammers by P.J. Chadwick produced some additions to the results of the 1975-79 co-operative bunting survey, and the map in the systematic list shows the combined result. Additional records would be welcomed. Similar studies are being made of Stock Doves and of Skylarks.

GULLS ON THE TIDAL AVON

The following note by Dr H.E. Rose is of particular current interest.

Studies made thirty years apart by similar methods show that Black-headed Gulls feeding and resting along the lower stretches of the River Avon are now much more numerous than they were, but for Herring Gulls the reverse is the case. Lesser Black-backed Gulls, present in small numbers, have also increased. A few Common and Great Black-backed Gulls were seen irregularly in both surveys. Counts were made monthly from July 1949 to June 1950 by R.H. Poulding, and from July 1979 to June 1980 by the author. The census method was to count the gulls on the river between Cumberland Basin (Map reference ST568721) and Horseshoe Bend (ST540767), once a month, as nearly as possible to midday, on a day when this coincided with low tide. For most of the counting time the birds were feeding or resting on the mud; only a few were in flight, hence fairly accurate (± 10%) counts could be made from the river bank. The results are given in the table.

Gull Counts on Tidal Avon, 1949-50 and 1979-80

	Black-headed		Herring		Lesser Black-back	
	1949-50	1979-80	1949-50	1979-80	1949-50	1979-80
July	113	540	320	21	6	11
August	618	1150	390	7	8	12
September	400	2380	520	95	4	18
October	620	850	560	12	13	15
November	390	870	50	10	6	22
December	970	1900	50	55	0	16
January	970	2480	40	14	1	3
February	950	1250	80	38	4	17
March	510	2260	180	18	7	29
April	25	92	310	46	5	29
May	15	174	180	16	5	12
June	112	217	100	135	12	24

Poulding also made a census in 1954-55, with results similar to the earlier ones except that Black-headed Gull numbers had increased on average by a half. Counts made in the second half of 1980 (see Systematic List) agreed well with those for 1979.

From the table, we see that between September and March the number of Black-headed Gulls averaged 700 in the earlier period and about 1,700 in the later one. On the other hand the Herring Gull averages had dropped from over 200 to 35.

Some evidence about the earlier years of the century is given in H. Tetley's paper "Gulls in the Bristol District" (Proc. Bristol Naturalists' Soc., 1935, 99-103). No precise counts are given, but some quotations are relevant.

> "Within the last thirty years a great change has come over the Black-headed Gull in Bristol. At one time it was not a common bird, but it has increased greatly in numbers ... The Black-headed and Herring Gulls are easily the most numerous, the others being, at any time of the year, very much fewer, and of these two the former preponderates over the latter."

It is clear that the number of Black-headed Gulls feeding on the river has been growing for many years. This is in accord with the known changes at the nearest breeding colonies, in Dorset, Hampshire and Central Wales.

Since 1950 the local breeding colonies of Herring and Lesser Black-backed Gulls have experienced a dramatic growth, followed in the later 1970s by a massive decrease. Mudge and Ferns (see Systematic List) attribute the decrease tentatively to a form of botulism poisoning. The decrease at our nearest Herring Gull colony, on Steep Holm, has been particularly severe (see Systematic List), and this is the obvious explanation of the fall in the number of Herring Gulls feeding on the Avon.

So few Lesser Black-backs feed on the Avon that the fates of the large breeding colonies can have little bearing on them. The increase shown in the table is likely to be due to the formation and growth of the local population breeding on rooftops. If this is so, a corresponding increase in numbers of feeding Herring Gulls would be expected (they breed locally in roughly equal numbers), and this would mean that the fall in the number of feeding birds deriving from Steep Holm or elsewhere was even more striking than the tabulated figures suggest.

EXOTIC AND OTHER ESCAPES FROM CAPTIVITY, AND HYBRIDS

(The list includes some additional records for 1979)

FLAMINGO sp.
Two, Sand Point, 14 July, 1979 (presumed to be Chilean).

BARNACLE GOOSE
Escaped birds, probably from Slimbridge, Glos.: 1979: at CVL, eight stayed from 1978; eleven, 12 January - 24 February and ten on 25th. Single birds at Northwick Warth, 22-29 April; Aust Warth, 7 May; and Sand Point, 4 June. 1980: three ringed birds, Severn Beach, 17 May. One at CVL from 14 June into 1981.

SNOW GOOSE
1979: one at Severn Beach, 18 April. 1980: one at CVL, 10-16 May.

SCAUP
Three colour-ringed birds, Bristol City Docks, from November 1979 to 11 April; two, 5-31 December. Male at ASW and Portishead, 21-23 February; an escape noted in area since November 1977

MANDARIN DUCK
Male, Dyrham Park Lake, January to 17 February; male, Victoria Park Lake, Bath, 16 March; male, CVL, 16-30 November (possibly feral - see foreword).

RED-CRESTED POCHARD
Pair, Victoria Park Lake, Bath, 16 March; a female there, 27 July.

RING-NECKED DUCK
A colour-ringed bird, CVL, 3 August - 21 September.

BARNACLE GOOSE x SNOW GOOSE
Two, CVL, November 1979 to 1 June; one, 15 June.

TUFTED x POCHARD
One, CVL, end March to 16 June; male, Blagdon Res., 26 October - 14 December.

POCHARD x ?
Male, CVL, 24 August.

SYSTEMATIC LIST

SOURCES

The following list is based on all records for Avon County sent to Bristol Naturalists' Society or Bristol Ornithological Club. Observers' initials are given only for rare or locally uncommon species, or where identification can present problems, or in case of unusual date, place, numbers or behaviour.

SEQUENCE

Species are arranged in Professor Dr K.H. Voous' sequence, as recommended by the Report Editors' Standing Committee, British Birds and the British Trust for Ornithology.

ABBREVIATIONS

NA denotes the part of Avon formerly included in Gloucestershire, and SA the remainder (formerly also District I of the Somerset Report). A few frequently mentioned place names are abbreviated:

ASW - Avonmouth Sewage Disposal Works and its surrounding area.
CVL - Chew Valley Lake.
SGW - The Royal Portbury Dock, the remainder of St George's Wharf and Portbury Wharf.
Severnside - the coast from Aust to the S. end of Chittening Warth.

The notation (BBRC) indicates that the preceding record has been accepted by the British Birds Rarities Committee.

ADDENDUM

Records of Blue-winged Teal and Snow Bunting, received too late for inclusion in the 1979 Report, appear in the appropriate places in the list below.

GREAT NORTHERN DIVER

SA The first-winter bird present at Blagdon Reservoir from 2 December 1979 remained until 23 January.

RED-THROATED DIVER

SA One at CVL, 2 March (JCM) and one, 1 April (RT).

LITTLE GREBE

NA Up to four at Tortworth Lake all year - pair reared three young. One or two, Littleton Pits, February - August. Single birds near Bristol Bridge, 10 February - 18 March; ASW, 9 September - 17 December; and Northwick Warth, 26 October (unusual on R. Severn).

SA Noted in winter on many waters; usually one or two, but more in December: 5, Keynsham; 7, Saltford; 6, Barrow Gurney Resrs.; 5, Loxton. Singles or pairs in breeding season at Keynsham, Saltford, Midford (1 brood), Newton Park, Portishead, Blagdon Res. (at least 1 brood). At CVL, 28 broods (42 young) equalling1971 record. Up to 12 at Barrow Gurney Resrs. and 19 Blagdon in September, indicating local dispersal. Monthly maxima at CVL:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	8	12		c.50	c.56	c.81	125*	110	58	12	2

*2nd highest post-breeding moult flock; cf. 147, Sept. 1959

GREAT CRESTED GREBE

NA One, Northwick Warth, 16 November.

SA Breeding records: two broods, Blagdon Res.; pair with 3 young at Hunstrete Lake, July; two nesting pairs, Litton Res., 26 May. At CVL, 92 young (53 broods) - third best on record - followed by return to normal autumn moulting numbers; monthly maxima there:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
16	27	19		66	70	247	412	291	335	231	100*

*100 on 6th fell to six by 31st - low mid-winter count typical of recent winters

Also up to 21 at Barrow Gurney Resrs., January-March; three, June; up to 45, September on; up to six, Blagdon Res., all year but up to 16 in March, 15 in June and 12, December; one, Chew Magna Res., March 16.

BLACK-NECKED GREBE

SA One in summer plumage at CVL, 15-16 June (CN, TBS, N&LT, KEV). An unusual mid-summer record.

FULMAR

NA Single birds at Hallen,16 June and New Passage, 19 July.

SA One, Portishead, 4 May. At Sand Point, first seen 29 March; at Brean Down, 29 March; thereafter up to three regularly noted until 15 June (four on 5 May), and in August. Up to three off Steep Holm, 26 April - 31 May. Two at Weston-super-Mare, 10 September and three off Brean Down on 14th, after gales (cf. Manx Shearwater).

LEACH'S PETREL

NA One at Severn Beach/Chittening, 9 October (GY).

MANX SHEARWATER

NA Northwick - Chittening: three, 19 July; one, 30 August and 12 September; two on 13th and 14th; one, 7 October and a late bird on 26th.

SA One off SGW and 69 off Sand Point, 21 June; 22 off Weston, 12 July. Regularly recorded off Brean Down, 2 May - 12 August; largest counts of 63, 15 June; 470 on 19th; 74, 12 July; 441, 12 August. One, Steep Holm, 31 May. September influx following gales: five off SGW on 10th; one picked up inland at Coley on 11th (released at CVL by DW) and eight off Sand Point on 12th.

GANNET

NA Two adults off Severn Beach, 17 July.

SA Intermittent records off Brean Down; singles, 24 April and 31 May; five, 15 June; three, 26 July and two, 29 August. One dead, Portbury Wharf, 31 August; one off Sand Point, 12 September and one dead in Sand Bay, 26 October.

CORMORANT

Regular reports of small numbers throughout county, including central Bristol (Cumberland Basin) and on the R. Avon at Saltford. Small influx into the Channel after the mid-September gales

NA Up to 14 at Oldbury and up to eight, Severn Beach area, September.

SA On Steep Holm, 49 nests reported, 18 May. Numbers at CVL rather low, due no doubt to shooting by Bristol Waterworks Co.; one found dead there, 29 November had been ringed as a nestling in July 1971 on the N. Solway, Scotland; monthly maximum counts:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
34	28	18	11	2	3	11	22	17	26	38	34

Other records included: seven, R. Axe, 1 January; ten, Brean Down 22 July, and 18 on 13 September. Up to nine resting on electricity pylons, M5/R. Axe, in February and 11 on pylons at Loxton, 7 December.

SHAG

SA Unusually many records. Brean Down: adult, 30 March (GJU); one, 11 October (JA); one 1st-winter, 1 November (JH). Two, Sand Point, 9 September (RA). Immature, Axe Estuary, 14 September (BR). Immature, Steep Holm 7-11 October (KAMT). Three 1st-winter birds, CVL, 2 November, two staying until 9th and one until 18th (PJC, N&LT, KEV et al.).

GREY HERON

Widespread reports of small numbers throughout the county.

NA One, Westbury-on-Trym, Bristol, 21 December, flew low overhead in street lights, at 19.00 hours.

SA About 71 occupied nests reported: 38 at Cleeve, one at Clevedon Court (first record here), seven at Newton Park, 19 at Portbury and six at Uphill (decrease here due to felling of dead elms). Largest counts elsewhere: nine, Blagdon Res., 21 December; maximum numbers at CVL in August - November, with 26 on 4 and 26 October; 19 at Keynsham, 5 January and 13 December. One found dead, Monkton Combe, 6 September had been ringed as a nestling at Wickhampton, Norfolk on 30 May, 1974.

MUTE SWAN

NA Single broods at Eastville Park and St George Park, Bristol. Winter herd again developed in Bristol Docks; monthly maxima:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
59	44	37	23	10	10	nc	nc	5	30	24	43

SA Single broods at Blagdon Res., Bucklands Pool, Kenn Moor, Limpley Stoke Canal (breeding pair) and Portishead; five broods (28 young) at CVL, where also record moulting numbers, with peak on 2 August; monthly maxima as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
6	10	7	nc	25	77	125	126	111	98	16	9

Elsewhere, eleven, R. Axe, 19 April; up to seven, Barrow Gurney Reservoirs, September to October, up to 22 at Blagdon Reservoir, June to August; no herd at Bucklands Pool, Backwell, where the resident pair drove off arrivals.

BEWICK'S SWAN

NA Typical November records on coast: two at Chittening on 2nd, two, ASW on 7th and seven, New Passage/Northwick on 30th; twelve at Northwick Warth, 29 December.

SA Eight, Bucklands Pool, Backwell, 16 January; 30 at Blagdon Res. and CVL, 16 February; eight still at CVL next day, and 15 there, 1 March. First autumn birds: five near Clevedon, 27 October. Family party of six also six other adults at Blagdon Res. and CVL, 2-23 November; up to eight adults (mainly at CVL) present until 26 December. Six on Kenn Moor, 9 December.

PINK-FOOTED GOOSE

SA The bird first seen on 22 November, 1979 remained at CVL until 10 February.

WHITE-FRONTED GOOSE

Very few compared with 1979. In NA, one near Severn Beach on 19 January, two on 4 April and one on 6th-7th; 29 in flight over Yate, 30 January. Again seen between Severn Beach and Severn Bridge in November: one on 8th and 15 on 30th; one at Sheperdine on 11th. Only one record from SA: three at Clevedon, 30 November.

GREYLAG GOOSE

SA Feral birds again present at CVL, where a small moult gathering seems to be developing. One, 19 January; two, 11 May - 12 June; three, 13 June, seven 14 June - 7 September; six, 8 September.

CANADA GOOSE

NA One at ASW, 24 March and 6 April; three, 17 April. Eleven flew SW over Frampton Cotterell, 11 September.

SA Two, Blagdon Res., 9 March and 19 April. One, SGW, 16 April. At CVL, eight broods (33 young), and monthly maxima as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
80	74	56	nc	29+	82	113	111	111	128	121	115

BARNACLE GOOSE See Introduction

SA Four, Yeo Estuary then over Sand Point, 19 October (RA, HER).

BRENT GOOSE

All records refer to the dark-bellied race, Branta b. bernicla. It seems likely that the three 21 December records refer to the same birds.

NA Four, Northwick Warth, 13 January; two, Severn Beach, 2 November and one on 16th; three, Chittening, 21 December.

SA One, Clevedon - R. Yeo, 24 October and 13 November; three, 21 December. Three, Portishead, 21 December, and one at SGW next day.

SHELDUCK

County total only 200, early January, rising to c.300, early May (sometimes up to 400 through movements from Glos. and Som.); 80 in mid-July and 25 in September, rising to 260 by end of year. First brood seen, Kingston Seymour, 25 May; small downy young in Sand Bay, late July. Nest with 4 eggs, and possibly second nest, Steep Holm. Estimated 140 young produced in SA and 20 in NA. At resrs., up to three early in year and September onwards, with rise at CVL to 13 in May, falling to two (last seen, 27 June); no breeding. In 1979, nesting female killed during mowing at W. End, Nailsea; eight young reared by farm worker and returned to wild.

WIGEON

Some 1,000 in county in mid-January (under half the 1979 total); fewer than 300 in mid-February and March; late birds at Clevedon, 4 May, Oldbury (NA) on 5th and CVL up to 16th.

Returning birds from 21 July (2, CVL), but under 65 present on 11/12 October (51 at CVL); influx in early November, with c.600 present in second week (307 at CVL) then 450-600 to end of year.

GADWALL

NA One at ASW, 3 January; up to eight at Tortworth Lake early in year, and three in December. At Littleton Pits, one on 20 April, two in autumn and up to eight in December.

SA Approximately 70 present in January (60 at CVL) but only 30 in February. About 100 at CVL on 11 May; 15 pairs bred later, and maximum count was 315 on 24 August. Area total 146 on 13 September, about 100 in October, 35 in mid-November and 23 in mid-December (though 52 at CVL on 23rd). One pair bred at Blagdon Reservoir.

TEAL

National Wildfowl Count data available for some areas only:

	Jan	Feb	Mar	Sep	Oct	Nov	Dec
Severnside	76	44	100	3	2	152	245
Clevedon - Yeo	6	4	5	0	0	65	45
Blagdon Res.	520	200	85	100	215	410	420
CVL	480	187	200	467	276	269	426

Other significant counts: 270, Severnside, 8 January; 110, Barrow Gurney Resrs., on 19th and 100 at Sand Bay on 26th. At CVL, 540 present on 24 August but only 160 on 26th; counts of 700-750 from both Blagdon and CVL in late November - December, but the combined total on 24 December was 795.

MALLARD

A total of 58 broods or nests was noted at the reservoirs, and another 60 or so at 30 other sites, including a brood of 9 small ducklings at Eastville Park Lake, Bristol on 17 December. The county total was some 2,000 in mid-January but only c.800 a month later; approx. 2,300 in early August and 3,100 at end month; some 2,100 in mid-October, 1,850 in mid-November, and 2,175 a month later.

Maximum monthly counts from selected areas are tabulated. The figures should not be added as birds move between sites (e.g. only 1,000 at CVL when Blagdon total at its maximum).

	Jan	Feb	Mar	Aug	Sep	Oct	Nov	Dec
Severnside	75	22	22	20	32	100	67	82
ASW	63	37	42	26	47	100	50	40
Barrow Gurney Resrs.	231	66	18	420	495	333	260	191
Blagdon Reservoir	410	140	55	960	296	310	425	565
CVL	515	261	151	2160	1820	1387	990	958

PINTAIL

NA One, Severnside, 5 April; another on 23 November and four on 30th; two, 13 December. Two at Littleton Pits on 29 December.

SA Coast: four, Portishead, 13 January; one in Axe Estuary, 26 January - 2 February, and four on 11 October; two, Sand Bay, 6 September. Reservoirs: 10 in January; 23 at CVL, 16 February and 13 on 2 March. Male at CVL from 8 June. Area total reached 29 (26 at Blagdon Res.) on 2 November but only four present in December.

GARGANEY

SA Noted only at CVL: pair, 10 March; female, 2 April, then a pair and an unmated male all summer (four birds, 2 August) and up to two in September; last record: a female, 20 September.

BLUE-WINGED TEAL

SA One of this N. American species, a rare vagrant here, was identified at CVL on 19 November 1979 by DGHM, L & NT et al. (BBRC).

SHOVELER

County total varied from 35 to 90, January to March; far more in second winter period - 75 to 135, August and September (but 235, CVL, 24 August), and c.180 in mid-October, then a sharp influx - over 700 at CVL on 1 November (AHD) and 820 on 2nd (KEV) - but fewer than half by end month; further fall in December, with some 190 from 15/16 December to end of year. Three pairs bred, CVL.

POCHARD

NA Occasional (max. 4) at Tortworth Lake and Littleton Pits. Regular at ASW, January to March (max. 15) and October on (max. 37). Bristol City Docks: up to five, January - mid-February; four, December.

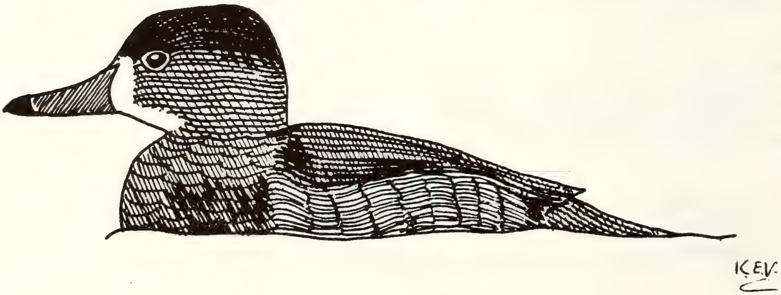
SA National Wildfowl Counts (mid-month):

	Jan	Feb	Mar	Sep	Oct	Nov	Dec
Blagdon Res.	55	15	11	6	5	5	335
CVL	183	26	18	32	6	51	44

Other notable counts (showing considerable movement): 260, CVL, 2 August; 323, Barrow Gurney Resrs., 7 November) but c.260 from 8th to year-end); and 750 at Blagdon Res., 23 November. At Bucklands Pool Backwell, up to 36 in January, and 100-120 roosted in December. Off Sand Point 30 flew NE with five Tufted Ducks, 1 November. Four pairs bred at CVL.

RING-NECKED DUCK

SA An immature female of this N. American species was found at CVL on 15 June by KEV. It stayed to 9 August, seen by many observers, then moved to Cheddar Res., Somerset, where N&LT found it on 17 August (BBRC). A second female was found at CVL on 3 August; it carried a coloured ring so was considered an escape. It was last seen on 21 September and underwent complete wing moult while present. (BBRC). Neither bird showed the tear line behind the eye or the prominent white bill band usually described as characteristic of the species. KEV's sketch is reproduced below.



TUFTED DUCK

Noted on most waters in winter, with the following maximum counts. In NA, Tortworth Lake 38; Littleton Pits 12; St George Park, Bristol 38; Bristol City Docks two (January - February). In SA, Wills' Lake, Hartcliffe, Bristol 9; Bucklands Pool, Backwell 18; R. Avon, Saltford six (but 37 in January); Barrow Gurney Reservoirs 158 (on 19 October); at Blagdon and Chew Valley Reservoirs the National Wildfowl Count data were as follows:

	Jan	Feb	Mar	Sep	Oct	Nov	Dec
Blagdon	45	60	110*	195	170	105	75
CVL	205	243	176	295	113	165	115

*Count of 400 on 9th, indicating probably passage movement.

Nine broods noted at CVL, where summer total rose from 210 at end of June to 375-500 in July and August.

SCAUP

NA Three females off Northwick Warth - Severn Beach, 26 October - 2 November, then two until 8 December.

SA CVL: party of seven (four adult males), 29 March; single males, 4 April, 4 July - 30 August; and immature, 23 November Pair off Yeo Estuary, 15 April.

EIDER

SA One off Clevedon coast, 9 November - 28 December. Seven off Brean Down on 30 November, and one off Sand Point on 15 December.

LONG-TAILED DUCK

NA Male off Aust Warth, 20 April.

SA Female at CVL on 27 January, joined by juvenile male on 3 April; both stayed until 26 May. Immature male, Blagdon Reservoir, 26 October.

COMMON SCOTER

NA Single birds off Severnside on 19 March, 13-14 April, 26 June, 10-24 August and two on 19 October.

SA Axe Estuary and off Brean Down: one, 5 January; eight, 4 May and four on 11th; ten, 26 July. Male, CVL, 31 March; male, Barrow Gurney Resrs., 12 October; immature off Clevedon, 2 November.

VELVET SCOTER

NA Male flew up-river off Chittening, 9 November (RGT).

SA Male off Clevedon sea wall, 28 September (HER).

GOLDENEYE

NA A female or immature bird off Northwick Warth, 30 November and another at Littleton Pits on 20 December.

SA National Wildfowl Count data were as follows -

	Jan	Feb	Mar	Oct	Nov	Dec
Blagdon	11	9	22	nil	10	6
CVL	12	30	13	1	10	11

Up to eleven at Barrow Gurney Resrs., January - March, and up to twelve in second winter period. Last spring record - one at Blagdon res., 6 May; first autumn arrival - one at CVL, 3 August. Female at Bucklands Pool, Backwell, 4-22 January; one on Kenn Moor, 6 December; one on R. Axe near Loxton, 27 January, and six there on 7 December. Coastal records: three off Sand Point, 26 October; three at SGW, 2 November, and one on 9th; one off Brean Down, 23 November, and one off Clevedon coast, 23-29 November.

SMEW

SA The male at Blagdon Reservoir and the female at CVL at the end of 1979 stayed until 24 March and 3 May respectively. A 'brownhead' visited Bucklands Pool, Backwell on 4 February; another, at CVL on 10 December, was the only record in second winter period.

RED BREASTED MERGANSER

SA Male, CVL, 14 January. 'Brownhead', Clevedon - R. Yeo, 15 - 24 February, and two more at Blagdon Reservoir, 26 October.

GOOSANDER

NA Eleven 'brownheads' flew SE off Severn Beach on 23 November.

SA Reservoirs: one at Barrow Gurney, 26 January and 21 December; up to nine at Blagdon, January - 16 March and in November-December; at CVL, max. of 27 in January, 45 in February, 37 in March and ten in April, with a pair to 27 May; the female stayed all summer. Autumn arrivals at CVL from 23 October (two), with steady increase from ten on 1 November to 41 by 30th; peak count of c.58 on 6 December, and 43 present on 31st. Counts often lower, possibly due to movements to R. Avon, Saltford (eight flew NE past Stantonbury Hill, 10 km NE of CVL,, on 15 March) up to eight on river, January to 16 April (but 15 on 27 March) and up to five in December (but ten on 24th). Coast: five to NE off Brean Down, 20 November; one off Clevedon on 28 December.

RUDDY DUCK

SA County total of 263 in December 1979 rose to 357 by 12 January and 400 by 20th. Birds favoured CVL in January and Blagdon in February. Total was 340 on 2 February (300, Blagdon) and c. 330 on 10th-16th, but only 195 by 16 March and c.50 on 30th. Up to 11 in county, April-May; two pairs bred at CVL (broods of 4 and 2); also a duckling with a Pochard brood. Up to 25 at Barrow Gurney Resrs. in October - November; county total rose from 95 in mid-October to c.185 on 15 November, then 289 on 16 December and 342 on 20th.

RED KITE

SA One flew east over Saltford, 13 April (MS).

MARSH HARRIER

SA One flew over Brean Down into Avon, 27 April (BR) and one visited CVL on 3-4 May (RMC, AHD, CN); both were female/immature.

HEN HARRIER

Single female/immature birds (perhaps the same) at Sand Bay on 8 October and 18 October - 23 November, and another, 15 November (RA, CFD, TBS, KEV et al.), and one at Northwick Warth on 2 November (BL).

SPARROWHAWK

Breeding-season records from 46 localities, with evidence of breeding at one in ST46, three in ST55/56, five in ST57 (including three within Bristol City boundary) and two in ST66. Widely reported during rest of year, including a report of one chasing Pied Wagtails at their roost in the shopping area of Broadmead, Bristol, on 31 October.

BUZZARD

NA Breeding season reports from three localities in ST69 and two in ST77.

SA Breeding season reports from 16 localities, of which five were in ST47. Many reports outside the breeding season included one of twelve individuals together in the Ashton Hill/Wraxall area on 10 February.

OSPREY

SA One at CVL on 3 May (RMC, CN) and two next day (AHD).

KESTREL

Many widespread reports from both urban and rural areas in all months. However, evidence of breeding was obtained only at fourteen sites: two in ST46/47, six in ST57 (including five within the Bristol City boundary), three in ST58, two in ST66 and one in ST77.

MERLIN

NA Many records of a female between Chittening and Aust Cliff, January to 22 March and 12 October to end of year; reported taking Dunlin, Skylark, Redwing and Linnet (PJC, BL, NTL, RGT). Female, Sheperdine, 11 November (AEB, PJC).

SA A female or immature at Blagdon Res., 13 September (KEV); one at CVL, 11 October (RMC). A female, Sand Point, 26 October (KEV et al.) and at Axe Estuary, 6 December (RA).

HOBBY

NA Pair probably bred - adult with juvenile, 24 August. Two records of single birds in another area during breeding season. One, Purdown, 25 June (RLB). One, Severn Beach, 27 August (ACK).

SA Many reports, May to September, suggest breeding within a few kilometres of CVL.

PEREGRINE

NA Immature, Chittening, 15 January (GY); one, Northwick, 27 December (BL).

SA Female, Loxton, 28 December, 1979 - 2 March, also a male, 1 January and 17 February (JKK). One, Clevedon coast, 15 February (HER). One, CVL, 23 March (KEV). Immature, Sand Point, 26 October (PBK et al.).

RED-LEGGED PARTRIDGE

Only two breeding-season reports from NA: one bird at Oldbury and two at Littleton Warth; this perhaps reflects a shortage of observers rather than of birds, as reports from SA (seven of pairs and two of single birds) were twice as many as in 1979. Coveys were noted in NA at Codrington (7, January) and in SA at Marksbury Vale (9, November) and Portbury (6, December).

GREY PARTRIDGE

NA Breeding-season records came from Littleton Warth, Alveston, Marshfield, Westerleigh and West Littleton. Winter coveys were seen at Marshfield (max. 15), Pucklechurch (7) and Cadwell Hill (6).

SA Breeding-season records came from six areas (cf. nine in 1979). Five reports of winter coveys, the largest of 17 (Saltford, January).

QUAIL

Scarce summer visitor. Seven calling, Marshfield, NA in August. Female and eight young near Hunstrete, SA, mid-July.

MOORHEN

Numerous widely-distributed reports of juveniles suggest a good breeding season. Breeding reported at three places within the Bristol boundary.

COOT

Bred in NA at Tortworth Lake, Littleton Pits and ASW, and in SA at Hunstrete Lake and the reservoirs. At CVL, 174 young (72 broods) (KEV). Monthly peak resr. counts (table) show a marked influx in January, and compared with 1979 a more rapid spring dispersal, the same July total and considerably more thereafter.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BG	131	68	40						150	155	85	44
BL	500	300	1000					311	42	171	290	303
CVL	722	495	392	123	47	633	1088	1787	1467	946	440	421

OYSTERCATCHER

NA Small numbers on coast in all months - mostly S of Severn Bridge, where usually up to three but seven in April and 16 in August; occasionally one or two at Oldbury Power Station. One on stubble, Tormarton, 13 August (JDRV) - unusual inland record.

SA Noted (up to 12) in all months, Clevedon - R. Banwell, but only occasionally and in smaller numbers north of Clevedon. In Sand Bay and Axe Estuary, max. of 50-70 in winter; absent for most of June and July; evidence of autumn passage in August and September - max. of 160, Axe Estuary, 13 September. Inland only at CVL, where single birds in February, March and July, up to 13 in August (and 21 flew over on 6th) and up to 14 in September.

LITTLE RINGED PLOVER

No records from NA. At SGW (where a pair bred in 1979) four on 12 April (MTD); two, 5-17 May and on 29 June; and one, 10 September. One, Sand Bay, 3 May (TBS) and one, Saltford Sewage Farm on 11th (JWD). At CVL, single birds on 11/12 April and four May dates (but two on 18 May) (8 obs.); autumn passage 20 July to 28 September, with one or two in July and August but seven, 9 August and eight on 13th, and up to four throughout September. Two at Blagdon Res., 3-6 September. All the autumn passage birds were juveniles except for one adult at CVL on 9 August.

RINGED PLOVER

Table gives monthly maxima in main areas: in NA, at Oldbury Power Station and Severn Beach to Chittening; in SA, Clevedon to R. Banwell, Sand Bay, Axe Estuary and CVL. Other reports only from Sea Mills (three in March and one in November) and Blagdon Res. (up to six in last week of September). Bred at SGW, where up to six were present in April and May, and one chick was seen.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	40	4	10	nil	1	nil	10	700	300	30	49	47
SB-C	47	26	8	150	240	146	31	400	175	187	39	45
C-RB		4	1	3	35	155	25	120	10	100	8	
SBay	12		18		52		3	450	250		20	
Axe	28	38			20			105	40		15	43
CVL					1		3	83	50	40		

KENTISH PLOVER

SA One, Sand Bay, 5 May (HER).

GREATER SANDPLOVER

SA The bird present at CVL from 17 November 1979 was last seen on 10 February. This was the second record for Great Britain and Ireland, not the third as stated in the 1979 Report. Detailed accounts of both birds are given in British Birds 73:568 and 583.(BBRC).

GOLDEN PLOVER

NA On coast noted only Aust - Severn Beach, where single birds in January, May and September onwards. At Westerleigh, 200 in January and 70-90 in November and December; at Pucklechurch, 50 in December.

SA Noted from 1 January to 21 May and 25 July to year-end. Counts of 100 or more from Saltford (109, December); Burnett (145, April); Marksbury (126, January, 100, March); Yatton Moor (400, December); Clevedon - R. Banwell (200, January, 128, October); Axe Estuary (100, September and 240 October). At CVL, one or two in January, August and September, up to 80 in October and November, then eight.

GREY PLOVER

NA Noted on coast from 1 April to 12 June, and from 10 August onwards: up to five, Oldbury-on-Severn; up to four, Northwick; 18 at Aust on 28 September; ones and twos, Severn Beach to Chittening.

SA Coastal records up to 15 June and from 17 August onwards. Max. of seven anywhere, except for 35 over Sand Bay on 25 April. At CVL, one present on 25/26 May and six in flight, 14 August.

LAPWING

NA Bred at Latteridge (1 chick seen) and Aust (4 eggs), and probably at Dodington Ash, Falfield, Cromhall and Charfield. 700 at Northwick in January, 150 in February; autumn flocks:- 190 on 29 June reached 1,100 in August and 1,250 in September, then fell to 600 by December. On R. Avon at Sea Mills, 110 in January and 95 in February, falling to two on 20 March; present again from 6 June, with max. of 95 on 18 August. In Tormarton - Old Sodbury area, autumn flocks reached 800 in August, 750 in September, 350 in October and 100 in November.

SA Bred at Newton Park, Bath (5 nests found), Ashton Marsh (2), Congresbury (2), Clevedon - R. Yeo (2) and Portbury (1) and also probably at Queen Charlton, Nailsea and Kenn Moors and CVL. The table gives monthly maxima in areas where numbers reached 400: Nailsea and Kenn Moors, Clevedon - R. Yeo and CVL.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N/K.M.	400		70					160	181	330		4500
C-R.Y	450	110	40	30	30	600	1000	1000	300	400	300	200
CVL		550	43		13	30	300	707	1025	1560	2000	1875

KNOT

NA Oldbury-on-Severn: three, 9 November. Aust to Chittening: one, 21 February; up to seven, first half of May; up to four occasionally, 31 July - 28 September; in October, from 40 to 135 present, 3rd - 26th.

SA Except for flocks of 65 at Axe Estuary in January and on 19 September, no count exceeded eight. Single birds at Sand Bay in March and at Clevedon, 4 May. Autumn passage, 25 July to 5 October with up to eight in Sand Bay on seven dates, one at Axe Estuary on 13 August and one or two at Clevedon, August and September. Two at Sand Bay, 13 November and at Clevedon, 28 December.

SANDERLING

NA Aust - Severn Beach: spring passage from 12 April to 1 June, with max. of seven on 29 May; autumn passage 28 July - 11 Ocobter, with one or two on five dates.

SA One winter record: three at Sand Bay on 27 January. Spring passage 14 March to 8 June, with maxima of eight at Kenn Estuary, 25 May; ten at Sand Bay, 3 May, and five at Axe Estuary on 31st. Autumn passage 8 August - 15 September: up to eight at Sand Bay, but 50 on 30 August. CVL: two, 3 May; one, 23 July; two, 21 September.

LITTLE STINT

No spring records received.

NA Oldbury-on-Severn: up to three, 10 August - 14 September (5 dates) (TGE, JDRV). Severn Beach: one, 14 September and one, 26/27 September (BL, NTL, RGT).

SA Single birds, Clevedon, 28 September (HER); Sand Bay, 30 August, 9 and 11 September (RA, GJF, TBS); and Blagdon Res., 1 November (DE). CVL: noted, 19 August - 19 October; up to two in August, up to ten in September and up to five in October (many observers).

TEMMINCK'S STINT

SA Two at CVL, 30 August - 21 September (GP, N&LT, KEV et al.).

PECTORAL SANDPIPER

SA Two, CVL, 7 - 21 September (KEV et al.).

CURLEW SANDPIPER

NA Oldbury Power Station: two, 31 August (TGE, JDRV); Severn Beach: one, 1 September (BL).

SA One, SGW, 13 May (ARL) - the only spring record. Single birds at Sand Bay, 8 August, 8/9 September (RA, PBK); and at CVL, 26 July and 17 - 31 August; also three, 23 September, six on 27th and eight on 28th (ten observers). Two, Blagdon Res., 26 October (AHD).

PURPLE SANDPIPER

NA Reported only from Severn Beach - New Passage, January to 4 May and 15 November onwards; up to three in January and February and one or two thereafter, but five from 15 December to year-end.

SA Two at Sand Point, 20 January (HER).

DUNLIN

The table gives the monthly maxima in the main areas: in NA, Oldbury Power Station and Severn Beach to Chittening; and in SA, Clevedon to R. Yeo, Sand Bay, Axe Estuary and CVL. A few colour-marked birds seen at Clevedon and Sand Bay, October to December, resulted from a programme of colour-marking on The Wash and on the Dutch/German coast in the autumn.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	1000	1000	300	nil	2	nil	750	600	300	270	1000	1500
SB-C	2500	2000	150	350	850	42	104	200	93	400	2000	700
C-RY	2000	1700	1200	350	420	80	300	300	30	800	1800	1200
SBay	2200	500	68	45	500	2	550	400	500	500	4000	2200
Axe	3000	3000	2500		70						1500	2000
CVL	40	21	4	2	3	1	7	35	67	70	175	129

BUFF-BREASTED SANDPIPER

SA One, CVL, 16 September (C. Hurford, J.P. Martin, M.C. Powell). (BBRC). This was the eighth or ninth individual to be recorded in Avon. The first was at Blagdon Reservoir in September 1973.

RUFF

NA Northwick Warth: five, 25 September, one on 27th and two on 28th (PJC, RGT). R. Avon, Sea Mills:one, 1 October and 13 December (HER).

SA Coast: one, Yeo Estuary, 17 - 31 August (HER); three, Axe Estuary, 31 August (BR). CVL: four, 1 March (CN, KEV); one from 23 July, then present throughout August to October (monthly maxima 15, 63 and 13); four, 2 November; eight, 16 December, one on 24th and 28th. Blagdon Res.: up to seven, 23 August - 26 October (18 on 25 September).

JACK SNIPE

NA Single birds at Oldbury Power Station, 13 December and Northwick to Chittening, 24 and 30 October and 21 and 24 December.

SA Coastal records up to 24 April and from 19 October onwards. Up to seven at Clevedon and five at Sand Bay in first part of year, and up to six and two in latter part. One, Portishead, on 24 December. CVL: one, 16 February; two, 6 and 21 September; one, 29 November.

SNIPE

NA Recorded on coast up to 21 April and from 26 August; often up to ten, but 15 Northwick to Chittening, 23/23 November. At ASW, up to seven in September/October, otherwise under five. Inland, 10 on muddy ground at Westerleigh, 12 December.

SA Coastal records up to 13 May and from 24 August onwards. Maxima in the two periods in main areas: 15 and 35, Clevedon to R. Banwell; 20 and 10 in Sand Bay. Present at reservoirs up to 5 April and from 6 July, with peak monthly counts as follows.

	Jan	Feb	Mar	Apr	:	Jul	Aug	Sep	Oct	Nov	Dec
Blagdon	3	5	4		:		8	3	60	13	20
CVL	10	15	7	6	:	3	20	53	59	70	10

Other counts of over five birds: 32, Axe Estuary, January; 14, Kenn Moor, 9 March; 18, Ashton Marsh, 13 April; 18, Saltford, 29 December. One drumming, Weston Moor, 27 April, but no breeding records were received.

WOODCOCK

NA Chittening: one flew across Severn to Gwent, 5 February (NTL). Cromhall: six put up (one shot), Abbotside Wood, 27 December (per JH).

SA Recorded at Leigh Woods (four, November), Abbots Leigh (up to four, January and December), Walton-in-Gordano (five, October), Stantonbury Hill(four, January), High Littleton (one, January), CVL (one, December), Burrington Combe (one, December) and Bleadon Hill (three, January).

BLACK-TAILED GODWIT

NA Oldbury Power Station: ten, 5 May; three, 27 July; two, 7/8 August and one on 16th. Northwick - Severn Beach: one, 10 August; one, 9 November; ASW: one 9 and 11 September.

SA SGW: three, 20 April; two, 4 May; one, 24 August. Yeo Estuary: one, 7 April; four, 6 July and one on 13th. Sand Bay: one, 27 August and one, 6 September. Blagdon Res.: 24 July, CVL; one, 18 January; one, 24 March; two, 26 July; one, throughout August and on 6 September, and two on 29 October.

BAR-TAILED GODWIT

NA Spring passage 11 April to 25 May: in NA, up to four at Oldbury-on-Severn and Severn Beach, but 14 at latter on 3-4 May; in SA, up to four at SGW, 19 at Clevedon - R. Yeo and 55 at Sand Bay. Present again from 30 August: three at Oldbury and one at Aust in late September, and two at Northwick in late November; in SA, up to three at Sand Bay on four dates to 4 October.

WHIMBREL

Spring passage from 10 April to 5 June; counts over eight; ten, Aust to Chittening, 3 May and nine on 10th; ten, SGW, 4 May; 26, Brinsea Moor, Congresbury, 26 April; 12, Nailsea Moor, 5 May; 50 Kenn Moor, 27 May; at CVL, maximum of six. Autumn passage 6 July to 9 September; largest count was three at CVL on 3 August.

CURLEW

The table gives the peak monthly counts in the main areas: in NA, Oldbury Power Station, Severn Beach to Chittening, and the Avon at Sea Mills; and in SA, Clevedon to R. Banwell, Sand Bay, Axe Estuary and CVL. The only other significant count was of 510 at Littleton-on-Severn on 3 October.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	10		9		90	97	22	5	20	28	22	54
SB/C	94	89	50	17	7	38	120	130	92	240	116	67
Avon	41	29	19	nil	nil	nil	nil	1	nil	18	22	19
C/RB	109	130	80	13	6	20	300	60	40	110	84	85
SBay	125	200	90	32	30	50	130	180	200	120	70	232
Axe		160	100							180	40	300
CVL	8	2	5	4	nil	nil	6	6	3	1	1	nil

SPOTTED REDSHANK

NA One in full breeding plumage, Oldbury Power Station, 30 May. One or two on coast and at ASW on ten dates, 25 August - 16 September.

SA On coast, one or two on nine dates, 25 August - 1 November. At reservoirs: at Blagdon, single birds on five dates, 24 August to early October; at CVL, one on 12 July and two on 29/30th, up to 17 throughout August, ten or more in September (36 on 21st), up to ten in first half of October, then four; one, 1 November.

REDSHANK

Bred in SA at Congresbury (4 eggs); and probably at Nailsea Moor, SGW and Clevedon coast, and in NA at Avonmouth. A red-dyed bird seen at Yeo Estuary on 13 July had been marked on the Firth of Forth earlier in the year. Table gives peak monthly counts in main areas - for key to localities see Curlew.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	20	40	26	nil	nil	29	90	123	14	54	32	22
SB/C	300	150	47	17	nil	1	120	300	156	230	296	187
Avon	100	95	75	1	nil	2	1	3	55	118	70	135
C/RB	60	70	65	42	30	90	110	140	130	130	75	75
SBay	150	69	6			17	110	115	190	130	110	60
Axe	85	60	45							120	80	100
CVL			1	1		1	4	3	12	4		

GREENSHANK

Spring: one or two on coast, at ASW and CVL on eight dates, 12 April - 17 May. Autumn: noted from 29 June to 2 November; on coast, up to three on 41 dates, also eight on Clevedon coast, 13 July, and five in Sand Bay on four dates, July - August; inland, usually one or two at reservoirs but up to eight at Blagdon in August and September, and 40 on 21 September, and at CVL maxima of 14 in August (on 30th) and 20 in September. Single birds at Bucklands Pool, Backwell on 15 August and 29 September.

GREEN SANDPIPER

On coast, present in all months except May and June; mostly one or two birds, but four at Sea Mills in March, and up to nine at SGW, 1 March - 13 April; in autumn, occasionally up to four at Littleton-on-Severn and ASW, 2 July to end of year; up to five at SGW and Clevedon coast, 3 August - 25 November, with 13 at SGW on 22 September. At Blagdon reservoir, one on 29 June, up to seven throughout August and September and one on 24 December. At CVL, present in all months except January; generally up to three, but with maxima of 17 in July, 15 in August, 12 in September and seven in October.

WOOD SANDPIPER

A poor year: recorded only at CVL, where two on 31 July, a juvenile from 2 - 25 August and one on 21 September.

COMMON SANDPIPER

Winter: in NA, one at Sea Mills, January to March and 1 October onwards; one at ASW on 13 dates in January; in SA, one at R. Banwell, 13 December, and one at CVL from 2 November to year-end.

Small spring passage, 25 April - 3 June; most counts of one or two, but up to seven at Sea Mills, five at SGW, six at Bucklands Pool, Backwell, four at Blagdon Res. and more at CVL, where maxima of 15 in April, 11 in May and two in June. One or two on R. Avon at Keynsham and Saltford, and one on R. Frome.

Autumn passage from late June to late October; many records of up to three on coast, at reservoirs, R. Avon and Bucklands Pool, but maxima of 12, Aust to Chittening, eight at ASW, seven at Sea Mills, 16 at SGW (on 10 August), 22 from Clevedon to R. Yeo and at CVL 17 in July, 27 in August, nine in September and four in October. One in Bristol City Docks, 30 June.

TURNSTONE

Occurs mainly from Severn Beach to Chittening (NA) and at Clevedon (SA), where monthly peaks were as follows.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SB/C	121	130	130	180	250	16	20	178	175	190	120	116
Clev.	22	21	25	27	5	4	5	18	28	30	27	22

Counts over eight also from Sheperdine (NA) - 74, 17 February; and Portishead (SA) - 30 on 23 March, and 15 throughout December.

WILSON'S PHALAROPE

SA One at CVL, 13 - 23 September (RMC, KEV, LJW et al.). Fifth record for Avon. (BBRC).

GREY PHALAROPE

SA One at Axe Estuary, 9 October (BR). One at CVL, 11/12 October (JA, RMC, RGT et al.).

ARCTIC SKUA

SA Noted off Brean Down: two (light-phase), 19 April (TAB); one 3 May; two on 4th; one, 26 July and three, 7 October (all dark-phase) (BR). Two (dark-phase), CVL, 31 May and another, 31 August (KEV).

GREAT SKUA

SA Single birds off Brean Down over Avon waters on 19th, 23rd and 24th April, and 30 August (BR).

MEDITERRANEAN GULL

SA Reported only from CVL: four sightings of at least two adults at roost on 9 February, and an adult and a 2nd-winter bird on 8, 9 March (KEV); the adult stayed until 3 April; a 1st-year bird, 30 March to 18 April (TBS, RGT et al); an adult, 21 December (CN, KEV).

LITTLE GULL

First seen, 29 March - two immatures at Blagdon Res. and two adults at CVL; at latter, one or two immatures on various dates to 1 June, and one or two adults to 6 April; on coast, six over Oldbury silt lagoon (NA) on 19 May and one on 30th, and two immatures in Axe Estuary on 31st. In autumn, juveniles at CVL, 17 August - 18 September (two, 30 August) and on 8 November; two juveniles, Sand Bay, 31 August.

SABINE'S GULL

Possibly three juveniles in the county in mid-September, as single birds were seen off New Passage, flying south, on 13th (BL, NTL, RGT); at CVL on evening of 13th (TEB) and in Axe Estuary on 14th (BR). One juvenile off Sand Point on 11 October (ACK). Only five earlier records since 1900 for Avon area, the most recent being of an adult and a juvenile at CVL in the autumn of 1973, and the earliest being in 1954.

BLACK-HEADED GULL

Table gives monthly maxima from regular counts of feeding or moving birds, Severn Beach - Chittening (RGT), at ASW (BG), on R. Avon (Bristol City Docks to Sea Mills, midday, low tide) and on coast, Clevedon to Yeo Estuary (both HER). Large counts on Durdham Down, Bristol (e.g. 2,000 in January and 1,100 in December) reflect movement from R. Avon at high tide; other large inland counts in NA included 750 at Tockington and 285 at Hambrook in January, and 660 in February and 900 in November on Southmead Playing Fields, Bristol; in SA, winter peaks of 760 in January and 340 in December at Bucklands Pool, Backwell (EVS).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SB-C	750	500	300	100	45	21*	1250	2250	1000	750	500	800
ASW	850	1100	500	30	150	30	250	250	250	200	600	650
Avon	2480	1250	2260	92	174^{x}	217^{x}	540	1150	2450^{+}	990	1080	1600
Cl-Y	500	1000	400	400	40	40	500	2000	600	750	300	400

*on 12th; 200 on 22nd. $^{+}$on 8th. ^{x}mainly 1st-year.

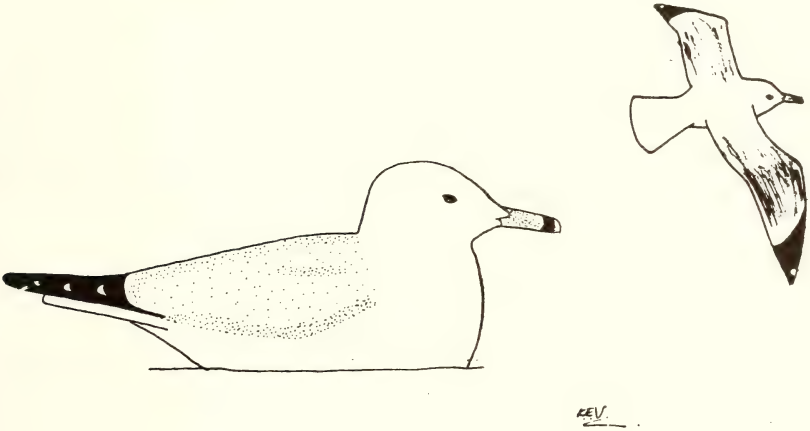
Return after breeding illustrated by daily increase at Wills' Lake, Hartcliffe, Bristol from one on 30 June to 250 by 24 July.

Marked autumn passage; several waves of 1,000 to 2,500 noted, Severn Beach to Axe Estuary, 14 July - 9 August and 22 - 25 August.

One found at Hanham, 15 August (dead c.15 days) had been ringed as a nestling at Bialystok, Poland on 4 June 1978.

RING-BILLED GULL

SA At CVL on 22 March, KEV found one of this N. American vagrant, with Black-headed and Common Gulls, and observed it for 45 minutes with AJM, CJN and GP. KEV's drawing, made from his field sketches, is reproduced here. (BBRC).



COMMON GULL

Except at roosts, numbers very low. Of 50 reports, January to April, the highest total was 80 in Weston Bay on 16 February. Up to 35 on Severnside and 15-25 on Southmead Playing Fields, Bristol. A leucistic bird was seen at CVL in February and March. Autumn records from late July; 60 at Severnside on 2 August, and 120 at Little Sodbury on 23rd. Some 600 in Weston/Sand Bay on 6 December, and 370 near Langford (ST480605) on 10th; next highest SA total was 20 on Bucklands Pool, Backwell on 30 December, but in NA c.1,000 were feeding in Marshfield - Dodington area throughout December.

LESSER BLACK-BACKED GULL

Records understate status - see roost data and 1979 Report. In first winter period, scattered flocks of up to 15 reported; in spring, max. totals were 60 at Radstock on 13 April, and 29 on R. Avon from Bristol docks to Sea Mills on 18th. Apart from roost data (800 at CVL, late October), the highest summer - winter counts were 27 at Barrow Gurney resrs., 25 August; 57 at Lansdown, Bath on 6 September; 28 on tidal Avon in October and 18 in November; and nine at Long Ashton on 13 December. A Scandinavian-type bird was noted at CVL on 6 January and two on 23 March. One found dead near Clevedon, 29 June 1980 had been ringed in its 2nd year at Weston-super-Mare, 13 June 1967.

GREAT BLACK-BACKED GULL

One or two (occasionally up to four) at reservoirs, on tidal Avon and here and there on coast in most months. Five, Sand Bay, 25 April; eight, CVL, 30 May. Unusual inland record of two near refuse tip, Olveston (NA), 27 January. One over Abbots Leigh (SA) on 20 October and two on 26th.

HERRING GULL

See note by Dr H.E. Rose in Foreword.

NA Up to 34 at ASW. On tidal Avon, max. of 135 (in June).

SA Some 1,000 feeding in mid-channel off Sand Point on 8 April (TBS). A yellow-legged bird resembling R.A. Hume's Type D (Brit. Birds 71:338-345) was seen at CVL on 3 February (KEV).

KITTIWAKE

NA Four flocks totalling c.400 flew up-river past Severn Bridge, Aust, 29 March (PJC, BL). One off New Passage, 17 Ocobter.

SA First-winter bird at CVL on 30 March; also two on morning of 25 October, with exceptional inland total of 70 flying high to W. on same evening (CN, KEV). One in Weston Bay, 28 December.

GULLS AT ROOSTS

As part of the B.T.O. Wintering Lesser Black-backed Gull Enquiry, the gull roost at CVL was counted in January - March. (For December 1979 data see Avon Bird Report for 1979).

Date	B-headed	Common	Lesser B-b	Herring	Great B-b
Jan. 27	9750	7010	255	635	3
Feb. 24	12000	5200	360	55	4
Mar. 30	400	725	105	20	8

Roosting Black-headed Gulls were also counted at Avonmouth (11,600 in mid-January but only 4,200 on 31st - AH); off Clevedon (1,100 on 9 November - HER); and at the Axe Estuary (1,300 on 23 February and 750 on 22 March).

GULLS - BREEDING

The Steep Holm breeding population has declined in recent years - dramatically so in the case of Herring Gulls. This is in line with a general decline in the Bristol Channel area (see "A Census of Breeding Gulls in the Inner Bristol Channel" by G.P. Mudge and P.N. Ferns, Cardiff 1980). The Avon County data are given below, with the percentage changes since 1975.

	Steep Holm		Elsewhere*	
Lesser Black-backed	555	-6%	90	+137%
Herring	2732	-66%	187	+163%
Great Black-backed	30	-27%	0	-

*rooftop nests in Bath, Bristol and Portishead and three Herring Gull nests at Clevedon

SANDWICH TERN

SA One spring record - one at Axe Estuary, 31 May (RA). At CVL, one was present on 27 August, six on 20 September and eight on 21st; on latter date six were reported from Blagdon Reservoir.

COMMON TERN AND ARCTIC TERN

Spring passage: early records of two at Blagdon Res. and one at CVL, 12 April; main passage 1 - 14 May, with several parties of 30 - 43 and peak on 4 May (345 during 3½ hours, Severn Beach) and 5th (132, CVL); most of those specifically identified were Arctic. Smaller passage of Common Terns, 8 - 15 June (max. 6, Oldbury Silt Lagoon). Autumn passage 6 July - 30 September, mostly noted at reservoirs; all records of ten or fewer except on 21 September when 50 C/A at Barrow Gurney and 46 C/A at Blagdon. During autumn 27 Common and 15 Arctic Terns specifically identified.

LITTLE TERN

NA Five flying NE off Severn Beach, 14 June (RGT).

SA Two at Portishead, 4 May, flying NE (TBS); one at CVL, 21 September (GP, N&LT, KEV et al.); one at Axe Estuary, 11 October (RA).

BLACK TERN

Small spring passage from 4 April (four, Blagdon Res.) at reservoirs, and from 4 May (four, ASW) on coast, culminating with 11 at New Passage and 30 at CVL on 12 May. Marked autumn passage at CVL: 186, 25 July; 67 on 26th, falling to 35 by 30th; then small numbers at CVL and other reservoirs to 28 September and here and there on coast, 7 - 27 September.

STOCK DOVE

Widespread reports, all months. Breeding season reports from 42 1-km grid squares. Largest flocks: 80, Tockington (NA), 7 December, and 410 at CVL (SA), 10 December.

WOODPIGEON

Common and widespread, but under-reported; only eight breeding records received. Flock of 1,000, CVL, 22 November.

COLLARED DOVE

Reported in all months from 28 1-km squares in NA (21 in the breeding season) and eight in SA (six in breeding season). The largest flocks noted were 300 at Avonmouth (NA), January and February.

TURTLE DOVE

Noted in eight NA and nine SA areas, 23 April - 23 August.

CUCKOO

Reports from 28 localities in NA and 39 in SA, 18 April to 21 September; one breeding record.

BARN OWL

Reports throughout the year from 15 localities (four in NA), including three breeding sites.

LITTLE OWL

Reports, all months, from 28 localities in NA (including four breeding sites) and 53 in SA (including two breeding sites).

TAWNY OWL

Reports, all months, from 18 localities in NA (two breeding sites) and 39 in SA (including five breeding sites).

LONG-EARED OWL

SA One found on M5 near the St Georges Interchange (Weston) on 16 April had been dead about a week (BR).

SHORT-EARED OWL

One - two present at SGW (SA) in early March and at Chittening (NA) in the latter half of December (DNC, NTL, CN, RGT).

SWIFT

Reported from 27 April to 12 September. Large flocks at CVL in May - June with peak of estimated 10,000 on 31 May.

KINGFISHER

Widespread reports; breeding reported from two localities in NA and from five in SA.

HOOPOE

NA One on waste ground off Midland Road, Bristol, 9 April (FHR).

SA One, Clapton-in-Gordano, 14-15 April (FG). One, Barrow Hospital, 25 April (VP).

WRYNECK

SA One, Abbots Leigh, 5 September (JCG). One found injured, Clevedon, 5 September - released later (CFD). One ringed, Steep Holm, 4 October, (KAMT) - first record for the island.

LESSER SPOTTED WOODPECKER

Reported from eleven localities in NA (including one breeding record) and sixteen in SA. Undoubtedly often overlooked.

SAND MARTIN

Recorded from 26 March to 1 October, with successful breeding in SA at Pensford, Woollard, Keynsham Log Mills, Somerdale and Bathford. Up to six pairs prospected drainage holes at Keynsham Police Station but did not remain to breed.

TREE PIPIT

Reports of up to 14 migrating birds, 4 April - 11 May and 24 August - 3 October, but 56 on 2 May, forming part of a large movement up coast from Brean Down. Breeding season reports from Tog Hill (NA) and Burrington Combe and Wellow (SA).

ROCK PIPIT AND WATER PIPIT

Reports (52) of up to six birds, coast and reservoirs, from 6 January - 5 May and 25 July to year-end. Water Pipits noted at CVL up to 5 April and 18 October - 5 November (up to four in January, and single birds at other times). Also four, Sand Bay, 8 November.

YELLOW WAGTAIL

Reports from coastal areas of up to 200 migrants. Breeding reported in NA at Littleton on Severn, Aust, ASW and Lawrence Weston, and in SA on coast SW of Clevedon, and at Blagdon. One wintered at CVL from December 1979 - last seen, mid-January 1980.

PIED WAGTAIL

Winter roosts: in NA, up to 2,000 at Oldbury Power Station, and in Bristol 500 at Cumberland Basin and 300 at Broadmead; in SA, over 300 at Keynsham. Some 50 feeding on ploughland, Portishead, 23 March. On Steep Holm, 94 recorded during autumn migration. Up to four White Wagtails noted, coast and reservoirs, 21 March to 13 May.

DIPPER

One or two noted in NA at Wick and St Catherine, and in SA, at Combe Hay, Midford*, Freshford, Saltford, Littleton nr Winford* and Clevedon. *Successful breeding recorded.

NIGHTINGALE

Males singing 20 April - 1 June; 21 at Inglestone Common and up to seven at Duckhole, Hay Wood, Midger Wood, Elberton, Horton Bushes, Stoke Park and Purdown (Bristol) and Ashwick nr Marshfield in NA, and at New Bridge and Friary Wood (Bath), Midford, Wellow, Dumkerton and Wraxall in SA.

BLACK REDSTART

Up to three reported, to 24 February and from 13 October, at Northwick Warth, ASW and Avonmouth Docks in NA and at Portishead, Clevedon, Weston-super-Mare, Blagdon Reservoir and Keynsham in SA.

REDSTART

Reports of one or two on passage, 12 April - 7 May and 10 August - 4 October, in NA on coast and inland at Horton and at Henlease, Bristol; and in SA at Arno's Court and Stockwood, Bristol and at Blagdon Reservoir. Breeding-season reports from Hill (NA) and from Publow area and Brockley Combe (SA) but no proof of breeding.

WHINCHAT

Reports (41) of up to ten birds on passage, 26 April - 7 May and 16 August - 4 October from coastal areas, also inland at Olveston, Hambrook, Doynton and Kelston in NA, and Stockwood (Bristol), Saltford, Priston, CVL and Nailsea in SA.

WHEATEAR

Reports (137), mainly from coast, of up to 56 birds on passage, 14 March - 29 June and 11 July - 2 November. Bred at Loxton.

RING OUZEL

SA Single birds, Shiplate Slait, 29 March (JP) and Sand Point, 4 April (TBS).

FIELDFARE

Many widespread reports, NA and SA, up to 23 April (flocks up to 350) and from 28 September (flocks of up to 700 by end of year).

REDWING

Many reports, NA and SA, of flocks up to 700, 1 January - 12 April and 29 September - 31 December. Roost at Stockwood (Bristol) in November and December had grown to estimated 14,000 by year-end.

GRASSHOPPER WARBLER

Singing males reported, 10 April - August, in NA at Inglestone Common, Oldbury-on-Severn, Littleton Warth, Tockington, Chittening, Hallen, ASW, Lawrence Weston, Filton, Stoke Park and Pucklechurch; and in SA at Wrington, Sand Point, Weston Wood, Blagdon, CVL, Knowle Hill, High Littleton, Stantonbury Hill, Dunkerton, Wellow and Tuckingmill.

SAVI'S WARBLER

SA A male, CVL, 16 April (CJN, RU). (BBRC). The first record for Avon of this S. and Central European species, of which a few pairs now breed in S. England.

REED WARBLER

Breeding season records in NA from Littleton Pits (63 birds ringed) and in SA from Nailsea and Kenn Moors, the Kenn and Yeo Estuaries, Bleadon, Saltford and CVL; at latter, 35 nests found, two containing young Cuckoos.

BLACKCAP

Of the 270 records received, from widespread NA and SA areas, 137 were of wintering birds. At Littleton Pits (NA) 52 were ringed, 40 of them birds of the year.

WOOD WARBLER

Breeding season records, 28 April - 26 June, in NA from Blaise and Kings Weston Woods and Snuff Mills (Bristol) and North Stoke; and in SA from Leigh Woods, Abbots Leigh, Portbury, SGW, and Brockley Combe. A juvenile ringed on Steep Holm was the first record for the island.

CHIFFCHAFF

Common summer visitor; small numbers overwinter (fewer than for Blackcap). One ringed as a juvenile at Blagdon Reservoir on 1 September was caught and released at Dungeness, Kent on 24 September.

FIRECREST

One or two recorded, 5 January - 7 April, in NA at Blaise Castle, Clifton Down and Hanham (Bristol) and in SA at Sand Point and the Yeo Estuary. A male was ringed on Steep Holm, 5 October.

PIED FLYCATCHER

Passage records of one or two, 10 April - 15 May and late August, from Severnside, Blaise Castle, Kings Weston Down and Combe Dingle (Bristol) in NA; and Arnos Court (Bristol), Leigh Woods, Abbots Leigh and Winford in SA.

BEARDED TIT

SA Up to seven noted at CVL, 2 January, 15 March, 18 and 19 October, and 27 November (AHD, KJH, HER, KEV).

WILLOW TIT

Records with confirmatory details of birds in NA at Inglestone Common (RA) and in SA at Goblin Combe (DW).

ROOK

The twenty 10-km National Grid squares falling wholly or mainly within Avon were censused for the B.T.O.'s National Rookery Census. In all, 7930 nests were found, a 21% increase on the 1975 total (6,572). Three squares showed decreases over 10%, and ten showed increases over 10% The squares with most nests were ST77 with 1,197 and ST78 with 734.

With the removal of dead elms there has been a major shift in the use of tree species since 1975: elm, 51% of nests to 5%; ash, 17% to 41%; pine, 4% to 7%; oak, 2% to 13%. Also, 53 nests were in electricity pylons (mostly near existing rookeries in the Aust to Tytherington area) cf. only two in 1975.

RAVEN
NA Pair flew over from Chepstow to Aust Warth, 13 January (PJC).
SA Pairs at Shiplate Slait, 2 March and Marksbury on 9th. One at Uphill, 12 July, (RA, JH, JKK).

BRAMBLING

Reports of up to 100, 5 January - 6 April and 12 October - 31 December, from 28 localities in NA and SA.

SISKIN

Numerous reports, covering all months, of parties up to 45, from widespread NA and SA localities.

TWITE

Flocks of up to 18 reported, 1 January - 19 March and 30 October - 29 November, from Hallen (NA) and Portbury Wharf, Portishead and Clevedon (SA).

REDPOLL

Reports (97) of flocks up to 40, 1 January - 1 June and 20 September - 31 December, from 27 localities in NA and SA.

CROSSBILL
SA Five, Blagdon Reservoir, 4 December (VG).

HAWFINCH

Reports of one or two, 13 February - 24 April, 21 June and 27 November, from Henbury and Shirehampton (NA) and Leigh Woods and Cadbury Camp (SA).

LAPLAND BUNTING
SA One, St George's Wharf, 22 and 29 March (GJU).

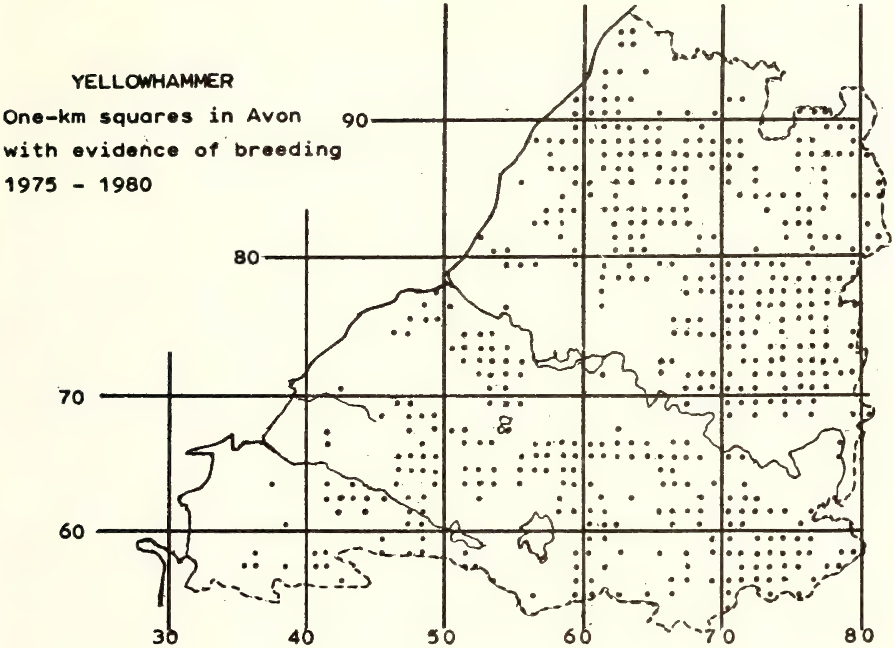
SNOW BUNTING

One, SGW, 11 November, 1979 (AHa). One or two, 9 November - 26 December at Severnside and Sand Bay.

YELLOWHAMMER

Singing males, nests or adults carrying food were found by PJC in 161 one-km grid squares. Of these, 26 were additional to the squares in which Yellowhammers were found breeding during the co-operative Bunting Survey, 1975-79, and they bring the total of "positive" one-km squares to 523 (see map).

Two males, singing on 17 February, held the same territories throughout the breeding season. Several winter flocks of 20-24 were noted in 10-km square ST77.


YELLOWHAMMER
One-km squares in Avon
with evidence of breeding
1975 - 1980
90
80
70
60
30
40
50
60
70
80

CORN BUNTING

Singing males, late May: 22 between Marshfield and Tormarton (NA) and two, Saltford (SA). Winter records of single birds at West Littleton (NA) and at Saltford and Sand Point (SA).

OTHER COMMON OR REGULARLY OCCURRING SPECIES PRESENT:
Residents: Pheasant, Skylark, Meadow Pipit, Grey Wagtail, Wren, Dunnock, Robin, Blackbird, Song Thrush, Mistle Thrush, Goldcrest, Long-tailed, Marsh, Coal, Blue and Great Tits; Nuthatch, Treecreeper, Jay, Magpie, Jackdaw, Rook, Starling, House Sparrow, Tree Sparrow, Chaffinch, Greenfinch, Goldfinch, Linnet, Bullfinch, Reed Bunting.

Summer or Winter Visitors: Swallow, House Martin, Sedge and Garden Warblers, Lesser Whitethroat, Whitethroat, Willow Warbler, Spotted Flycatcher.

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The names of M.S. Dugdale and D.E. Reid should have been included in the 1979 Report.

AVON & DISTRICT ENTOMOLOGICAL REPORT 1980

Compiled by the recorders of the Entomological Section

G.R. Best
R.S. Cropper
B.S. Harper
K.W. Miller
A.R. Nichols
K.H. Poole
R.H. Poulding
R.W. Rowe

In common with other reports involving systematic lists on a county basis, the Avon & District Entomological Report is restricted in length and hence one of the more difficult tasks of the recorders is to decide what to include. Priority is given to the more popular orders such as the Lepidoptera which constitute the bulk of the records received not only from entomologists but also from naturalists in other Sections. Observations on the majority of species of butterfly currently found in Avon are received each year, providing an important historical record of their status. The inclusion of a comprehensive account of this group is perhaps justified on the grounds of popularity and the number of records received, but some less popular orders are severely curtailed or in some cases omitted. However, all records are filed by the recorders, and those required by the Biological Records Centre at Monks Wood Experimental Station are extracted for the data bank. One encouraging feature of the 1980 records is the increasing number of identifications based on immature stages such as nymphs of Mayflies, ova of the Brown Hairstreak found in January and the identification of Diptera and Hymenoptera from plant galls and leaf mines. For some families such identifications are becoming less difficult because of the increasing number of excellent keys available for these pre-adult stages.

Apart from a cold January with below average temperatures the winter was generally mild with no prolonged falls of snow. April and May were dominated by the longest dry and sunniest spell in spring since records began which lasted eight weeks until the end of the third week in May. In contrast, June was the wettest in England and Wales since 1912 and also 3-4°C below average temperature. July and August were generally unsettled with short periods of dry, warmer weather particularly from the third week of August. There was a return to cooler, unsettled weather from the second week of September which continued until the end of the month. Autumn was a mixture of dry, anticyclonic spells and lows from the south-west giving unsettled, wet weather.

Records refer to Avon unless G, or S, appears after the locality denoting Gloucestershire or Somerset respectively, and are of single specimens unless noted otherwise. The following sent in records from which this report was compiled:-

R.A. Angles, R. Barnett, H.K. Barton, G.R. Best, C.S.H. Blathwayt, J.F. Burton, P.J. Chadwick, R.S. Cropper, E.W. Gane, D. Gillard, Miss I.F. Gravestock, B.S. Harper, Mrs M. Knight, J. Lord, K.W. Miller, A.R. Nichols , K.H. Poole, R.H. Poulding, B. Rosevink, R.M. Sellers, Mrs M.A. Silcocks, G.W. Sorrell, R.W. Rowe, A.H. Weeks.

BUTTERFLIES (Lepidoptera) by B.S. Harper

1980 was an unusual year for butterflies in the Avon area due to unfavourable weather conditions during June and July following a dry, warm spring. However, immigrant Red Admirals appeared to have had a successful breeding season resulting in abundant second brood imagines in late summer. This was particularly noticeable on Steep Holm on 16 August when members reported it as abundant. Ova, eggs and pupae were also recorded on the same visit.

Unfortunately the devastation of elms by the Dutch Elm Disease has now seriously depleted the population of the White Letter Hairstreak. For the first time for many years none were reported from Avon in 1980. On the credit side the Duke of Burgundy Fritillary was very successful in the Midger Wood Nature Reserve at Lower Kilcott, Northavon where it was reported as common in May. Perhaps the most noteworthy record was the discovery of several Essex Skippers by H.K. Barton at Michael Wood, nr Stone just beyond the northern boundary of Avon. This appears to be the first confirmed record of this species in the area covered by this report. No doubt the Essex Skipper is overlooked because of its similarity to the Small Skipper but perhaps others will be found as captured 'small skippers' are more critically examined before release.

The scientific names and order of species follow those given in the checklist of species in 'A Field Guide to the Butterflies of Britain and Europe' by L.G. Higgins and N.D. Riley, 3rd ed. (1975) and published by Collins.

Pieris brassicae L. (Large White).
Common; noted from 3 April to 27 September.

Pieris rapae L. (Small White).
Common; noted from 3 April to 27 October.

Pieris napi L. (Green-veined White).
Uncommon in most areas.

Anthocharis cardamines L. (Orange Tip).
Common; noted from 13 April to 3 June.

Colias crocea Geoffroy (Clouded Yellow).
Single at Sand Point, 25 August.

Gonepteryz rhamni L. (Brimstone).
Common in spring and early summer but few later sightings.

Limenitis camilla L. (White Admiral).
Two, Michael Wood, nr Stone, 8, 24 July and two, Wetmoor Nature Reserve, nr Wickwar, 24 July.

Inachis io L. (Peacock).
Noted from 15 January to 9 September but commoner from July onwards.

Vanessa atlanta L. (Red Admiral).
Noted in small numbers; first observed at Leigh Woods, Bristol and Brockley Combe, nr Brockley, 17 May and last recorded, Weston-super-Mare, 25 October.

Vanessa cardui L. (Painted Lady).
Widespread in small numbers from 4 June to 18 October.

Aglais urticae L. (Small Tortoishell).
Common, first noted 15 February and last reported 9 November.

Polygonia c-album L. (Comma).
Widespread but not common; noted from 3 April to 29 October.

Arygnnis pathia L. (Silver-washed Fritillary).
Brockley Combe, nr Brockley, 5 July; six, Wetmoor, nr Wickwar, 24 July and up to six, Lower Kilcott, during July; several Westridge Wood, nr Wotton-under-Edge, G, 31 July and a single Failand, 25 August.

Mesoacidalia aglaja L. (Dark Green Fritillary).
Cheddar Gorge, S, 29 June; two, Sandford Hill, nr Sandford, 16 July; Brockley Combe, nr Brockley, 24 July; two, Goblin Combe, nr Cleeve, 28 July and one, on 25 August; single, Crook Peak, nr Loxton, S, 3 August.

Clossiana selene Schiff. (Small Pearl-bordered Fritillary).
Six, Brockley Combe, nr Brockley, 5 June and one, Charterhouse, S, same date; three, Cheddar Gorge, S, 29 June and three Crook Peak, nr Loxton, S, 20 July.

Clossiana euphrosyne L. (Pearl-bordered Fritillary).
Three, Crook Peak, nr Loxton, S, 1 June; three, Brockley Combe, nr Brockley, 5 June and three, Goblin Combe, nr Cleeve, 17 July.

Euphydryas aurinia Rott. (Marsh Fritillary).
Common, Shapwick Heath, nr Shapwick, S, 25 May and 12, Charterhouse, S, 5 June.

Melanargia galathea L. (Marbled White).
Again not a good year for this species - noted from 26 June to 28 July. Largest number of 60 counted at Goblin Combe, nr Cleeve, 5 July; single, Charmy Down, Bath, where it was first found in 1979.

Hipparchia semele L. (Grayling).
Several records, Goblin Combe, nr Cleeve, July and August with maximum of ten, 21 July; three, Brean Down, S, 2 August and two, Sand Point on 3rd; two, Uphill, 9, 23 August and eight, Crook Peak, nr Loxton, S, 24 August with single, same place, September 7.

Maniola jurtina L. (Meadow Brown).
Common; noted from 25 June to 26 August.

Aphantopus hyperantus L. (Ringlet).
Short flight period from 2-28 July. Generally distributed with maxima of 25 at Goblin Combe, nr Cleeve and 50, St Catherine, nr Bath, but noted as common at Blagdon and Burrington.

Pyronia tithonus L. (Gatekeeper).
Common; noted from 4 July to 25 August.

Coenonympha pamphilus L. (Small Heath). Noted in small numbers from 7 May to 16 August. Reported as common in Avon Gorge and Walton Hill, Clevedon.

Pararge aegeria L. (Speckled Wood).
Widespread and common; noted from 2 April to 4 October.

Lasiommata megera L. (Wall Brown).
Two, Goblin Combe, nr Cleeve, 17 May with three, same place, 3 June but noted as common, 25 August; Yatton, 24 May, 21, 24 August; Congresbury, 18 May; Wains Hill, Clevedon, 24 May and four Walton Hill, Clevedon, 28 May; Weston-super-Mare, 28 June; **several, Steep Holm,** 16 August; several, Charfield during August and a single, Failand, 25 August.

Hamearis lucina L. (Duke of Burgundy Fritillary).
Very common at Midger Wood Nature Reserve, Lower Kilcott in May.

Thecla betulae L. (Brown Hairstreak).
Ova found at Walton Hill, nr Clevedon in January.

Quercusia quercus L. (Purple Hairstreak).
Three, Wetmoor Reserve, nr Wickwar 24 July and three, Michael Wood, nr Stone, G, on same date; two, Lords Wood, Chelwood, 9 August and singles, Clifton Down, Bristol, 19, 24 August.

Strymonida w-album Knoch. (White-letter Hairstreak).
No records received of this species whose larvae feed mainly on elm.

Callophrys rubi L. (Green Hairstreak).
Two, Crook Peak, nr Loxton, 4 May; up to seven, Walton Hill, nr Clevedon, May and early June; singles Charterhouse, S, 5 June and Priddy, S, 12 June.

Lycaena phlaeas L. (Small Copper).
Filton, nr Bristol, 14 May; two, Burrington Combe, nr Burrington, 24 July, 27 August; single, Failand, 25 August and five, Blagdon Lake same date; two, Hartcliffe, Bristol, 3 September; Congresbury, 21 September and two, same place, 4 October.

Aricia agestis Schiff. (Brown Argus).
Maximum numbers: six, Crook Peak, nr Loxton, S, 18 May; ten, Walton Hill, nr Clevedon, 28 May and six, Goblin Combe, 3 June. Also reported from Filton, nr Bristol, Brockley, Sand Point, Uphill, and Berrow, S.

Cupido minimus Fuessly. (Small Blue).
Eleven, Uphill, 17 May with 21 on 13 June, three on 26 July and three on 9 August; three, Charterhouse, S, 5 June and 15, Dolebury Warren, nr Churchill, 13 June. Although usually a single brood in June, records from Uphill suggest that a partial second brood may occur at Uphill.

Celastrina argiolus L. (Holly Blue).
Reported in small numbers only but many records from suburban parks and gardens.

Lysandra coridon Poda. (Chalk-hill Blue).
Twenty, Brean Down, S, 2 August and ten, Uphill, 16 August and a single, same place, 7 September.

Polyommatus icarus Rott. (Common Blue).
Noted in small numbers throughout the area from 17 May to 21 September.

Pyrgus malvae L. (Grizzled Skipper).
Six, Crook Peak, nr Loxton, S, 4 May, with two on 18 May and 8 June; two, Goblin Combe, nr Cleeve, 17 May; two, Sandford Hill, nr Sandford, 24 May and 20, Walton Hill, nr Clevedon, 28 May.

Erynnis tages L. (Dingy Skipper).
Three, Crook Peak, nr Loxton, S, 4 May and two, same place, 18 May with six seen 1 June; Shapwick Heath, nr Shapwick, 25 May; common, Goblin Combe, nr Cleeve, 17 May; 12 Walton Hill, nr Clevedon, 28 May; two, Charterhouse, Mendip, 3 June and three on 5th.

Thymelicua lineola Ochsen. (Essex Skipper).
Several identified, Michael Wood, nr Stone, G, in July by HKB. This appears to be the first confirmed record of this species in our area.

Thymelicus sylvestris Poda (Small Skipper).
Uncommon; noted from 22 June to 24 August.

Ochlodes venatus Turati (Large Skipper).
Very common and widespread; noted from 5 June to 28 July.

MOTHS (Lepidoptera) by K.H. Poole

1980 did not prove a particularly productive year for moths, despite one or two good nights, but a number of interesting species were recorded, among them the Brown-tail, a new record for Somerset; the Scarlet Tiger from a new locality; the Old Lady moth only rarely noted in the area, and the third and fourth records of Blair's Pinion. Once again the Privet Hawk-moth was only recorded from Bristol, and the Clouded Magpie from Weston-super-Mare. The only migrants to appear were the Humming-bird Hawk-moth and the Silver Y. Names are in accordance with Kloet and Hincks, 'A Check List of British Insects', 1977.

Sphinx ligustri L. (Privet Hawk).
Several records from Bristol (HKB, RB, BSH, GWS).

Macroglossum stellatarum L. (Humming-bird Hawk).
Two, Sand Point, nr Weston-super-Mare, 6 June and two, Uphill, 13 June (RAA); Ashton Park, Bristol 15 June (JFB) and Wickwar, August (MK).

Chaonia ruficornis Hufn. (Lunar Marbled Brown).
Leigh Woods, nr Bristol (RB) and Brockley, 15 April (HKB).

Euproctis chrysorrhoea (Brown-tail).
Berrow, S, 29 July (HKB).

Drepana binaria Hufn. (Oak Hook-tip).
Stoke Bishop, Bristol (RB).

Callimorpha dominula L. (Scarlet Tiger).
Larvae abundant, Nympsfield, nr Nailsworth, G, 10 May (HKB); Batheaston, nr Bath, 15 July (BSH) - this appears to be a new locality; Wotton-under-Edge, G, 31 July (RSC).

Arctia villaca L. (Cream-spot Tiger).
Sand Bay, nr Weston-super-Mare, 7 June (RAA).

Atolmis rubricollis L. (Red-necked Footman).
Weston-super-Mare, 13 July (CSHB).

Cryphia muralis Forst. (Marbled Green).
Knowle, Bristol (HKB).

Agrotis trux Hb. ssp. *lunigera* Steph. (Crescent Dart).
Weston-super-Mare, 16 July (CSHB).

Xestia agathina Dup. (Heath Rustic).
Charterhouse, 28 August (CSHB).

X. baja Schiff. (Dotted Clay).
Congresbury, 20 August (GWS).

Hadena confusa Hufn. (*conspersa* Schiff). (Marbled Coronet).
Larva found on Sea Campion (*Silene vulgaris* ssp. *maritima*), Sand Point, Weston-super-Mare in 1979, emerged 4 July (HKB).

Aporophila lutulenta Schiff. (Deep Brown Dart).
Midger Wood, nr Lower Kilcott, 15 September (HKB).

A. nigra Haw. (Black Rustic).
Very common, Midger Wood, nr Lower Kilcott, 9 September (HKB); Silk Wood, Westonbirt, G, 19 September (HKB).

Antitype chi L. (Grey Chi). Congresbury, 17 August (GWS) and Charterhouse, S, 28 August (CSHB).

Dichonia aprilina L. (Merveille du Jour).
Woods, Weston-super-Mare, 11 October (GWS).

Mormo maura L. (Old Lady).
Henleaze, Bristol, 5 July (JFB); Congresbury, 23 July (GWS); Wetmoor Nature Reserve, nr Wickwar, 2 August (HKB).

Celaena leucostigman Hb. (The Crescent).
Congresbury, 17, 18 August (RWR, GWS).

Archanara dissoluta Treit. (Brown-veined Wainscot).
Common, Berrow, 7 August (CSHB).

Stibia anomola Haw. (The Anomalous).
Common, Charterhouse, S, 28 August (CSHB).

Hopiodrina ambigua Schiff. (Vine's Rustic).
Berrow, S, 21 August (CSHB).

Orthosia miniosa Schiff. (Blossom Underwing).
Weston-super-Mare, late April (CSHB) and Stoke Bishop (RB).

Panolis flammea Schiff. (Pine Beauty).
Brockley Combe, nr Brockley, 15 April (HKB).

Cosmia diffinis L. (White Spotted Pinion).
Knowle, Bristol, 13 May (HKB).

Ipimorpha subtusa Schiff. (The Olive).
Wetmoor Nature Reserve, nr Wickwar, 2 August (HKB).

Lithophane leautieri Boisd. (Blair's Pinion).
Knowle, Bristol, 1 October (HKB); Congresbury, 12 October (GWS).

Archiearis parthenias L. (Orange Underwing).
Leigh Woods, nr Bristol, 2 March (HKB) and 15 April (JFB).

Geometra papilionaria L. (Large Emerald).
Congresbury, 7 July (BR).

Eulithis mellinata Fab. (The Spinach).
Portishead, 12 July (RHP).

Anticlea derivata Schiff. (The Streamer).
Leigh Woods, nr Bristol (RB), and Congresbury, 25 April (GWS).

Thera variata Schiff. (Spruce Conifer).
Knowle, Bristol, 14 May (HKB).

Eupithecia venosata Fab. (Netted Pug).
Stoke Bishop, Bristol (RB).

E. intricata Zett. ssp. *arceuthata* Frr. (Freyer's Pug).
Knowle, Bristol, 24 May (HKB) and Weston-super-Mare, 3 June (KHP).

E. nanata Hb. (Narrow-winged Pug).
Knowle, Bristol, 23 June (HKB).

E. pygmaeata Hb. (Marsh Pug).
Shapwick, S, 30 June (CSHB).

Anticollix sparsata Treit. (Dentated Pug).
Shapwick, S, 30 June (CSHB).

Abraxas sylvata Scop. (Clouded Magpie).
Few, woods, Weston-super-Mare, June and a single, 2 September (CSHB); Sand Bay, 13 July (RAA).

Selenia tetralunaria Hufn. (Purple Thorn).
Stoke Bishop, Bristol and Leigh Woods, nr Bristol, (RB), Leigh Woods, 9 August (GWS).

Ourapteryx sambucaria L. (Swallowtail Moth).
In sycamore wood above landing beach, Steep Holm, S, 26 July (RSC).

Lycia hirtaria Cl. (Brindled Beauty).
Chelwood, nr Pensford, 26 April (HKB) and Leigh Woods, nr Bristol (RB).

Biston strataria Hufn. (Oak Beauty).
Brocklet, 15 March (HKB).

Perinephala lancealis Schiff.
Leigh Woods, nr Bristol, July (GWS).

Other additions for the year to the Congresbury List (RWR and GWS) are Pheosia tremula Cl. (Swallow Prominent), Cilix glaucata Scop. (Chinese Character), Agrostis ipsilon Hufn. (Dark Swordgrass), Xestia triangulum (Double Square Spot), Diarsia brunnea Schiff. (Purple Clay), Melanchra persicariae L. (The Dot), Enargia ypsillon Schiff. (Dingy Shears), Oligia latruncula Schiff. (Tawny Minor), Caradrina clavipalpis Scop. (Pale Mottled Willow), Orthosia cruda Schiff. (Small Quaker), O. gracilis Schiff. (Powdered Quaker), O. incerta Hufn. (Clouded Drab), Conistra ligula Esp. (Dark Chestnut), Agrochola lota Cl. (Red Underwing), Epirrata dilutata Schiff. (November Moth), Eupithecia centauraria Schiff. (Lime-speck Pug), E. exiguata Hb. (Mottled Pug), Agriopus marginaria Fab. (Dotted Border), Menophora abruptaria Thunb. (Waved Umber).

This brings the total number of species recorded at Congresbury since 1975 to 171.

BEETLES (Coleoptera) By R.W. Rowe

1980 was notable for the common or local species rather than the rarity which the coleopterist, like other entomologists, hopes will be discovered as a surprise finding. Much of the field work has been the patient recording of the commoner species by a small number of workers with another comprehensive report by R.S. Cropper covering much of Avon and adjoining areas of Somerset, The note on the Coccinellidae has again been compiled by K.W. Miller.

The nomenclature followed is that given in Kloet and Hincks, 'A Check List of British Insects', 2nd ed. pt. 3, 1977.

Aegialia arenaria F.
Under sand, Sand Bay, nr Weston-super-Mare, 7 May (RWR) and several on mobile sand, Berrow, S, 21 September (RSC).

Chrysolina violacea Mull.
On vegetation, Burrington Combe, nr Burrington, 1 June (GWS).

Clytus arietus L.
Single specimens reported from Shapwick Heath, nr Shapwick, S, 25 May (RSC); Leigh Woods (Forestry Commission), nr Bristol, 1 June (RHP) and in garden, Congresbury, 26 June (GWS).

Malachius bipustulatus L.
On mixed vegetation, Congresbury, 24 May (RWR).

Hister cadaverinus Hoff.
On ground in garden, Congresbury, 3 June (RWR).

H. unicolor L.
In dung, Brean Down, S, 4 October (RSC).

Necrophorus investigator Zett.

Taken at light, Congresbury, 10 August (GWS).

Melolontha melolontha L.
Under raspberry canes, Congresbury, 22 May (RWR).

Lampyris noctiluca L.
Eight, old railway cutting, Congresbury, 25 July (RWR, GWS).

Dorcus parellipipedus L.
On path, Congresbury, 14 August (GWS) and one from dead elm, Brent Knoll, S, 5 October (RSC).

Apion aestivum Germ.
On White Clover (Trifolium repens) Leigh Woods, nr Bristol, 12 July (RWR).

Cetonia aurata L.
Several taken in garden, Hotwells, Bristol, 4 June (GWS).

Malthinus flaveolus Pk.
On mixed vegetation, Leigh Woods, nr Bristol, 14 June (RWR).

Plagiodera versicolora Laich.
Swept from low plants, Leigh Woods, nr Bristol, 22 June (RSC).

Dytiscus circumflexus F.
Female in brackish pool, Steart, S, 13 April and another in small pool, Berrow, S, 17 May (RSC).

Coccinellidae (Ladybirds)

No surprises in 1980 but the recording of the commoner species has continued providing invaluable data for the distribution pattern of ladybirds in Avon. The visit of the Entomological Section to Steep Holm, on 16 August provided three species - Coccinella 7-punctata, Adalis 10-punctata and Propylea 14-punctata (RWR). P. 14-punctata does not appear in recently published lists of coleoptera recorded from the island.

Other species of interest included Anisosticta 19-punctata, a local species usually found in marshy places, noted as plentiful at Chew Valley Lake in April by RSC; and Aphidecta obliterata taken from fir-trees near Priddy, S, in September (RSC).

DAMSELFLIES AND DRAGONFLIES (Odonata) by A.R. Nichols

Again less records received than last year mainly because of fewer observers returning records, but also, it seems, because fewer insects were about. However there was a compensation in that a new species - Cordulia aenia, the Downy Emerald - was added to the list for our area which was started in 1977. The distribution map for this species in Hammond (1977) shows two 10 km squares with post 1960 records for Avon and district. The total number of species noted in our area so far is twenty-three - all the species which Hammond (1977) notes as occurring here since 1960 except Erythromma najas, the Red-eyed Damselfly. One species was added in 1979 - Orthetrum coerulescens, the Keeled Skimmer - although it has been recorded from south-west Somerset previously.

The check list in The Dragonflies of Great Britain and Ireland by Cyril O. Hammond, published by Curwen Books, 1977, has been used for the scientific and vernacular names, and also for the order of species.

Coenagrion puella L. (Azure Damselfly).
Noted in many places including two new sites; several, Emborough Pond, Emborough, nr Chewton Mendip, S, 5 June and abundant, Dundas Aqueduct, S, same date (RSC).

Enallagma cyathigerum Charpentier (Common Blue Damselfly).
Abundant, Emborough Pond, nr Chewton Mendip, S, 5 June (RSC); pair in copula, Leigh Woods (National Nature Reserve), 8 June (RHP); several, Chew Valley Lake, 8 June (RSC); several, Catcott Heath, between Catcott and Catcott Burtle, S, 29 June (RSC) and plentiful, reservoirs, Barrow Gurney, 31 August (RSC).

Pyrrhosoma nympula Sulzer (Large Red Damselfly).
Few, Tealham Moor, nr Blackford, S, 4 May; Brean, S, 8 May; Churchill, 24 May and several, Charterhouse, S, 8 June. All records by RSC.

Ischnura elegans van der Linden (Blue-tailed Damselfly).
Noted at many localities; several males and one female var. rufescens, Hanham, nr Bristol, 22 June (RHP) and several, Chew Valley Lake, 3 August (RSC).

Lestes sponsa Hansemann (Emerald Damselfly).
Wellow Brook, nr Wellow, 5 June (RSC).

Agrion splendens Harris (Banded Demoiselle).
Up to ten, Hanham nr Bristol, 22 June (RHP).

A. virgo L. (Beautiful Demoiselle).
Several, Wellow Brook, nr Wellow, 5 June (RSC).

Brachytron pratense Muller (Hairy Dragonfly).
Few, Weston Moor, nr Walton-in-Gordano, 1 June (RSC).

Aeshna cyanea Muller (Southern Hawker).
Catcott Heath, nr Catcott, S, 29 June (RSC); Wells, S, 7 August (RSC) and Leigh Woods (Forestry Commission), nr Bristol, 26 August (RHP).

A. juncea L. (Common Hawker).
Several, Priddy Pools, Mendip, S, 20 September (RSC).

A. mixta Latreille (Migrant Hawker).
Several, dunes, Berrow, S, 21 September (RSC).

Anax imperator Leach (Emperor Dragonfly).
One male, Clifton Down, Bristol, 3 July (JFB) and two, dunes, Berrow, S, 27 July (RSC).

Cordulia aenea L. (Downy Emerald).
Few, Priddy pools, Mendip, S, 12 June (RSC).

Orthetrum cancellatum L. (Black-tailed Skimmer).
Female, Shapwick Heath, nr Shapwick, S, 25 May (RSC).

Libellula depressa L. (Broad-bodied Chaser).
Several, Shapwick Heath, nr Shapwick, 26 May; female, Ashcott Heath, Ashcott, 26 May; several, Catcott Heath nr Catcott, 29 June. All records by RSC.

Libellula quadrimaculata L. (Four-spotted Chaser). Two, dunes, Berrow, S, 17 May (RSC); plentiful, Priddy pools, Mendip, S, 12 June and several, Catcott Heath, nr Catcott, 29 June (RSC).

Sympetrum scoticum Donovan (Black Darter).
Several, Priddy pools, Mendip, S, 20 September (RSC).

Sympetrum striolatum Charpentier (Common Darter).
Female, Henleaze, Bristol, 25 August (RHP); female, Shirehampton, 27 August and male, same place, 3 October (RHP).

CRICKETS & GRASSHOPPERS (Orthoptera) by K.W. Miller

A particularly poor year for orthopterans and this was reflected in the number of records received - only four observers contributed notes mostly on the commoner species. Once again Platycleis denticula (Grey Bush Cricket) was recorded from Brean Down, S, where several males were heard stridulating on 27 July (RSC).

All three species of orthoptera previously recorded from Steep Holm were found on the visit of the Entomological Section on 17 August. These were Pholidoptera griseoptera (Dark Bush Cricket), Leptophyes punctatissima (Speckled Bush Cricket) and Chorthippus brunneus (Common Field Grasshopper).

TRUE FLIES (Diptera) by R.H. Poulding

The exceptional warm, dry spring favoured the emergence and survival of some early diptera the most notable being the Common Bee Fly (Bombylius major) which was reported from a number of localities where it was most frequently seen on primrose. The less common B. discolor, however, was not recorded.

Another species which was unusually abundant was the large empid, Empis tessulata, particularly in May and June on umbelliferous flowers and leaves waiting for insectivorous prey. In contrast, hover flies (Syrphidae) were low in numbers, except for early spring species, although a wide range of species were reported. The large concentrations on Sea Aster (Aster tripolium) noted in the Avon Gorge in 1979 did not occur in 1980 but the large gatherings of Eristalini in the autumn were repeated - a reflection of the wet, unsettled summer essential for the larvae of this tribe. The current distribution survey of the Gad Fly (Haemotopota pluvialis) and the syrphid, Volucella pellucens produced no new localities for the Gad Fly but two new 10 km squares were recorded for the syrphid. Both species appeared less abundant than last year with H. pluvialis again absent from favourable habitats surveyed on days of optimum weather conditions for this species.

The scientific names used are those given in Kloet and Hincks, 'A Check List of British Insects', Pt. 5, 2nd Ed., 1975.

Agromyzidae - Leaf Miners.

Phytomyza ilicis Curits (Holly-leaf Miner).
Mines of this dipteran leaf miner found on holly, Clifton Down, Bristol, 18 October (RMS).

Bombyliidae - Bee Flies.

Bombylius major L. (Common Bee Fly).
Maximum numbers, Leigh Woods, nr Bristol, 15 April where many were seen on primrose, celandine and dandelion (JFB) and ten, Leigh Woods (National Nature Reserve), 19 April (Ent. Section). Last recorded in Wildlife Reserve, Leigh Woods (Forestry Commission), 1 June (RHP).

Syrphidae - Hover Flies.

Xanthogramma pedissequum Harris (ornatum Mg)
Two, Henleaze, Bristol, 21 June and a single, same garden, 29 June (JFB).

Volucella zonaria Poda.
One, Redland, Bristol, early October (per JFB).

Sericomyia silentis Harris (borealis Fall.)
Two on flowers of Devil's Bit Scabious (Succis pratensis), Street Heath, Ashcott Corner nr Meare, S, 5 October (RCS). Five records for Somerset are listed by Audcent in Bristol Insect Fauna (Diptera), Proc. Bristol Nat. Soc., 28 (1), 1949, including one for Shapwick not far from Street Heath.

Xylotomima lenta Mg.
Pair on flowers of Ranunculus sp,, Leigh Woods (Forestry Commission), nr Bristol, 1 June (RHP).

Merodon equestris Fab (Large Bulb Fly).
The four recognised forms of this hover fly - M. equestris (typical form), var. narcissi, var. transversalis, and var. validus - were seen together, one of each form, on a single plant of Oxford Ragwort (Senecio squalidus) feeding on the abundant flowers, Henleaze, Bristol, 3 July (RHP).

Stratiomyidae - Soldier Flies

Oxycera pulchella Mg.
One beaten from Alder, Winscombe, 13 July (RSC).

Chloromyia formosa Scop.
Several, Steep Holm, 26 July (RSC).

TRUE BUGS (Hemiptera) by R.S. Cropper

Despite the poor summer weather which resulted in numbers being rather below average, a number of interesting records were made. Of the two species selected for special study, the Green Shieldbug (Palomena prasina) is proving common and widespread throughout Avon & district, but no records of the Flybug (Reduvius personatus) have yet to come to light. Presumably this species is present in the area.

Heteroptera

Piezodorus literatus Fab.
Two from gorse, Loxton Hill, nr Loxton, S, 20 April.

Myrmus miriformis Fallen.
Plentiful in grass, Cheddar Gorge, S, 16 April.

Physatocheila dumetorum Herrick-Schaffer.
Several on Hawthorn, Sandford Hill, nr Sandford, 24 August.

Deraeocoris scutellaris
Swept from grass, Cheddar Gorge, S, 29 June - a very local species recorded from only a few counties in England.

Macrotylus solitarius Meyer - Dur.
Swept from hedgerow, Lower Woods, Wickwar, 31 July and from Hedge Woundwort (Stachys sylvatica), its host plant, Winscombe, 10 August.

Harpocera thoracica Fallen.
Plentiful on oak, Sandford Hill, nr Sandford, 24 May and several also on oak, Rodney Stoke, S, 25 May.

Phylus coryli L.
On hazel, Winscombe, 13 July.

Notonecta marmorea Fab.
Emborough Pond, Emborough, nr Chewton Mendip, S, 5 June.

Micronecta scholtzi Scholtz.
Several in recently excavated channel, Chew Valley Lake, 8 June.

Cymatia coleoptrata Fab.
Several in water tank, Chew Valley Lake, 8 June.

Corixa dentipes Thomson.
Male, Orchardleigh Lake, nr Frome, S, 30 March. This is the first record of this species for v.c.6.

C. panzeri Fieber.
Reservoir at Barrow Gurney, 31 August.

Hesperocorixa moesta Fieber.
Clarkencombe round pond, Ashton Park, nr Bristol, 12 March.

Homoptera

Centrotus cornutus L.
Beaten from hazel, Sandford Hill, nr Sandford, 26 May and on bramble, margins of Cheddar Wood, nr Axbridge, S, same date.

SAWFLIES, BEES, WASPS, ANTS etc. (Hymenoptera) by G.R. Best

Tenthredinidae

Trichiocampus viminalis Fall. (Popular Sawfly).
Several larvae on leaves of Poplar, garden centre, Burrington Combe, nr Burrington, 27 June (JFB).

Chrysidae (Parasitic wasps).

Chrysis ignita L.
Several searching holes in mortar of old wall, Dodington, 23 July (RHP). A specimen taken at Congresbury, 27 July, 1979 by RWR has been confirmed as this species. The larvae of these brilliantly coloured parasitic wasps feed on the immature stages of various bees and wasps and are frequently seen around old walls where they are often locally common.

Formicidae (Ants)

Formica rufa L. (Wood Ant).
Two additional sites confirmed for the current survey of its local status and distribution - nests found at King's Wood, nr Congresbury and Cheddar Wood, nr Axbridge. All records of this declining species are required including details of woods where they appear to be absent.

Cynipidae (Gall Wasps)

Andricus quercus-calcis L.
This cynipid now appears to be widespread in the area. 'Knopper' galls on oak caused by this species reported from Almondsbury, Tortworth and Clifton Down, Bristol (RMS).

Neuroterus albipes L. (Smooth Spangle Gall).
Few spangle galls on oak, Clifton Down, Bristol, 18 October (RMS).

Vespinae (Social Wasps)

Vespa crabro L. (Hornet).
One in vegetation, edge of Chew Valley Lake nr Herriotts Bridge, 3 August (RSC). This is the first report of the Hornet in Avon & district for a number of years which should give an impetus to the current survey of this social wasp. In the Provisional Atlas of the Insects of the British Isles, Hymenoptera-Vespidae (1979) published by the Biological Records Centre, there is a post-1960 record for Avon in ST 57.

BRISTOL BOTANY IN 1980

by A.J. WILLIS

(Department of Botany, University of Sheffield)

The mean temperature for the year at Long Ashton Research Station, to which all weather records relate, was 0.1°C below normal, the rainfall 103% of average and the hours of sunshine 101.1% of average. Although January was colder than usual, February was a warm month (2.3° above average), and the spring a fairly normal one. June and especially July were, however, cold, and together with August were below average for sunshine, resulting in a poor summer. September was warmer and sunnier than usual, and although October was a cold month, the year ended in a mild and rather sunny December. The total rainfall for the year of 904.3 mm was unevenly spread, April being exceptionally dry, with only about one quarter of its normal rain. In contrast, February, March, June and October were distinctly wet months, 122.5 mm of rain falling in March (219% of average) and 122.2 mm in October (153% of average).

Not surprisingly in view of the weather, early season plants flowered at about their usual times. A few flowers of *Daphne laureola* were open in Cheddar Wood at the beginning of January, and in early February *Helleborus foetidus* was in flower on Churchill Batch; at that time *H. viridis* had well formed buds at Upper Langford, R.S.C. End of season flowerers, on the other hand, tended to be late. However, *Anacamptis pyramidalis* flowered well on Hursley Hill, near Pensford, S, P.J. Chadwick.

Many of the records made indicate the persistence of plants in stations from which they have previously been reported. Still present, for example, are *Erodium moschatum* on Purn Hill, Bleadon, S, and *Vicia orobus* at Charterhouse, S, R.S.C. *Trifolium micranthum* was refound on Observatory Hill, Clifton, G, by the Society's Botanical Section, C.M.L., also R.S.C. Other reports of persistence include *Spergularia rubra* on Bury Hill, Moorend, G, where it is growing on ground bare after bracken burning, and *Corydalis claviculata* at Iron Acton, G, A.L.G. Interesting confirmation of very early records include those of *Eriophorum angustifolium* at Lansdown, S, and of *Astragalus glycyphyllos* at Kelston, S, D.E.G. On the other hand *Heracleum mantegazzianum* appears to be lost from Montpelier Station, Bristol, G, A.L.G.

New records continue to be made in substantial number and include reports of a few taxa not previously known in the Bristol area. A hybrid *Solidago* (*canadensis x virgaurea*) from Winterbourne is believed to represent a second British record, and *Linaria x dominii* a first report for the Bristol area. The Hawkweed *Hieracium rigens* from two Somerset localities is reported as new to v.c.6, and the alien grass *Phalaris aquatica*, on Brislington Tip, as new to v.c.6 and the Bristol area. *Ecballium elaterium*, which fruited on Wick Rocks, is rare in Britain; also *Rumex crispus* var. *uliginosus*, on the bank of the Avon, is little recorded.

On the visit of the British Bryological Society to Bristol in September a number of interesting bryophyte records were made in the Avon Gorge, including several of *Bryum* segregates; *Ditrichum plumbicola*, a moss usually associated with lead-mine spoil, new to Somerset, is now known from three localities. Another addition to the N. Somerset flora is *Bryum caespiticium* var. *imbricatum* from Weston-super-Mare. The Bryophyte Section of the North-Western Naturalists' Union also visited Leigh Woods during the year, and confirmed many earlier records.

In 1980 the Gloucestershire Trust for Nature Conservation published *Wetmoor Nature Reserve: A guide*, edited by Dr George Hendry. The booklet gives useful information about the flora and fauna of the Wetmoor Reserve, Lower Woods, between Hawkesbury and Wickwar. Also published during the year was a paper by Mrs Sonia Holland entitled '*Carex digitata* L. (Fingered Sedge) in Gloucestershire', in the *Proceedings of the Cotteswold Naturalists Field Club* for 1978-80, Vol. XXXVIII, pp. 29-31. A sixth locality for this rare sedge is now known in Leigh Woods, S, C.M.L., beyond the range indicated by White. An account of the natural hybrid between *Ophrys apifera* and *O. insectifera* in Leigh Woods is given in *Watsonia* (A.J. Willis, 1980, Vol. 13, pp. 97-102); in 1980, some three flowering spikes of this orchid were located (C.M.L.).

J.W. White's own annotated and interleaved copy of his *Flora* has been refound by C.M.L. and A.L.G. This copy, previously seen by N.Y. Sandwith (see *Bristol Botany in 1958*, p. 423), and noted as 'in private hands', has been promised to the University of Bristol.

Names of contributors associated with several records, or with the determination of plants, are abbreviated thus:

J.A., Mrs J. Appleyard
E.J.C., E.J. Clement
R.S.C., R.S. Cropper
A.F.D., Dr A.F. Devonshire
T.G.E., T.G. Evans
I.F.G., Miss I.F. Gravestock
D.E.G., D.E. Green
A.L.G., A.L. Grenfell
G: Gloucestershire

G.P.K., G.P. Kidder
C.M.L., C.M. Lovatt
P.J.M.N., P.J.M. Nethercott
R.M.P., R.M. Payne
R.D.R., R.D. Randall
R.G.B.R., Capt. R.G.B. Roe, R.N.
A.C.T., A.C. Titchen
S: Somerset

For details of the area covered by this report, see *Bristol Botany in 1978*, p. 35.

Ranunculus penicillatus (Dumort.) Bab.
A few patches in the Wellow Brook, S; also in recently made pond, Crox Bottom, Gurney Slade, S, R.S.C., from which area it was previously known.

Ceratophyllum submersum L.
Congresbury, River Yeo, S, P.J.M.N. First recorded from ditches in this area as long ago as 1726 by Dillenius (see White, *Flora of Bristol*, p. 528), and subsequently reported fruiting in this vicinity by H.S. Thompson (*Bristol Botany in 1926*, p. 316).

Meconopsis cambrica (L.) Vig.
A few plants on disturbed ground Asham Wood, near Frome, S, P.J.M.N. (pointed out by J.H. Kemp, leader of a Somerset Trust for Nature Conservation open-day at this wood).

Fumaria capreolata L.
A good patch in flower by roadside, Cross, S, G.P.K. and R.S.C. White (Flora, p. 139) **reports** the plant near Axbridge in 1907 and 1910.

F. bastardii Bor.
Several plants in garden, Berrow, S, and in flower and fruit on tipped soil in field, Axbridge, S, G.P.K., comm. R.S.C. and A.L.G. The first v.c.6 record is from near Axbridge (see Bristol Botany in 1930).

Brassica nigra (L.) Koch
In small quantities, Kenn Moor and Puxton, S, P.J.M.N. This plant appears to be becoming scarcer.

Cardamine impatiens L.
A number of plants, Asham Wood, near Frome, S, J.H. Kemp and P.J.M.N. Reported in this locality in 1919.

Rorippa microphylla (Boenn.) Hyland.
Damp field border, Winterbourne Down, G, A.L.G.

Viola palustris L.
Plentiful on stumps of alder in silted up part of pond, Emborough, S, D.E.G. Reported from this area in 1918.

Polygala serpyllifolia Hose
With the somewhat calcifuge Viola canina L., conf. Dr S.M. Walters, Clifton Downs, Bristol, G, C.M.L. Still on the Downs nearby are Galium saxatile L. and Primula veris L.

Hypericum humifusum L.
Very sparingly, Bury Hill, Moorend, G, A.L.G. One plant on waste ground, Westbury-on-Trym, Bristol, G, A.F.D. Garden weed, Ladye Bay, Clevedon, S, K.T. Batty, conf. I.F.G.

Silene noctiflora L.
Faulkland, S, D.E.G.

Geranium sanguineum L.
A tiny patch near motorway, Court Hill, Clevedon, S, P.J.M.N. The status of this patch is uncertain however, there is an old record (see White, Flora, p.213) for Walton-in Gordano nearby.

Frangula alnus Mill.
One good sized tree, Westhay Moor, S, R.S.C.

Medicago arabica (L.) Huds.
Abundant, New Passage, G, A.L.G.

Vicia bithynica (L.) L.
Plentiful on steep clay bank of railway, Kilmersdon, S, and also one plant on embankment at Radstock, S, D.E.G.

Lathyrus aphaca L.
In some quantity and well established on disused railway siding, St Philip's Marsh, Bristol, G, A.L.G. Previously recorded in this site in 1914.

L. sylvestris L.
Several patches, Cheddar Wood, S, R.S.C. Persistent on the Berrow Dunes; at Wells and at Winscombe, S, R.S.C.

Geum rivale L.
A small patch, flowering well, west side of Chew Valley Lake, S, R.S.C. Also many fine plants of Lathyrus nissolia L. in rough grassland.

Sorbus rupicola (Syme) Hedl.
All old records of S. rupicola in the south of England and S. Wales are S. rupicola s.s., S. porrigentiformis E.F. Warb. or S. aria (L.) Crantz with more or less obovate leaves, P.J.M.N. The last is the commonest in the Bristol area. A specimen from Leigh Woods (see White, Flora, p. 307) traced by C.M.L. at the Merseyside Museums (LIV), which is a voucher for Flower's record of S. rupicola, proves to be S. aria (L.) Crantz s.s., conf. P.J.M.N.

S. x thuringiaca (Ilse) Fritsch
A tree, now about 30 years old, Black Rock Gully, Avon Gorge, G, first reported by Dr M.C. Smith in 1972, C.M.L. (1977), det. P.D. Sell, E.J.C. and P.J.M.N.

Lythrum portula (L.) D.A. Webb
Plentiful, with Juncus bulbosus L., in newly excavated pond, Lord's Wood, near Pensford, S, D.E.G. Last recorded from this site (as Peplis portula) in 1930.

Myriophyllum verticillatum L.
Dune slack, Berrow, S, Dr N. Malcolm.

M. spicatum L.
Chew Valley Lake, S, and quarry pool, Emborough, S, R.S.C.

Hippuris vulgaris L.
Walton Moor, Gordano Valley, S, R.S.C.

Scandix pecten-veneris L.
A few plants of this now nationally rare species in potato field, Winterbourne, G, A.L.G.

Sison amomum L.
With abundant Lythrum salicaria L., Puxton Moor, S, I.F.G., also P.J.M.N. Plentiful at Kingston Seymour, S, P.J.M.N., where previously known by Miss I.M. Roper.

Rumex crispus L. var. uliginosus Le Gall
Riverside, below Burwalls Wood, Avon Gorge S, C.M.L., conf. J.R. Akeroyd. This tidal river variant, probably much overlooked, is known from the Wye Valley (see B.S.B.I. News, April 1980, No. 24, p. 23).

R. pulcher L.
Several plants, Blackers Hill, near Chilcompton, S, R.M.P.

R. sanguineus L. var. **sanguineus**
Three plants, Old Zigzag, St Vincent's Rocks, Bristol, G, C.M.L. (shown on a B.S.B.I. visit to the Avon Gorge).

R. palustris Sm.
Several plants on margins of peat cutting, Sharpham, S, R.S.C. Still present in old peat cutting on Shapwick Heath, S, G.P.K., comm. R.S.C., where reported by White (Flora, p. 514) as plentiful.

R. maritimus L.
Several plants, old peat cutting, Shapwick Heath, S, G.P.K. and R.S.C.

Salix purpurea L.
In marsh, Paradise Bottom, Leigh Woods, S, C.M.L., no doubt from where reported in 1920 and 1934 (see Bristol Botany in 1953, p. 383). Also Caltha palustris L., probably the nearest site to the city (cf. White, **Flora**, p. 126).

Limonium binervosum (G.E. Sm.) C.E. Salmon
Large plant on Huntspill Wall, where a recent arrival, West Huntspill, S, R.S.C.

Centaurium erythraea Rafn
With white flowers, Sandford Hill, S, R.S.C. Also on Sandford Hill were Calamintha ascendens Jord. and plentiful Gentianella amarella (L.) **Börner**.

Nymphoides peltata (S.G. Gmel.) Kuntze
Pond, Paulton, S, D.E.G. Also Ranunculus peltatus Schrank.

Symphytum x uplandicum Nyman
Plentiful on wide verges by lane, Priddy, S, R.S.C.

Calystegia pulchra Brummitt & Heywood
Sneyd Park, Bristol, G, P.J.M.N. Also Silaum silaus (L.) Schinz & Thell. in marshes below Sneyd Park.

Verbascum lychnitis L.
Several plants on and above roadside verge, Axbridge, S, G.P.K., comm. A.L.G.

V. virgatum Stokes
Disused tip, Shortwood, G, and a single plant on waste ground, St Werburgh's, Bristol, G; two plants in 1979, on roadside, Stoke Gifford, G, A.L.G. Also waste ground, Radstock, S, D.E.G.

Linaria x dominii Druce
Several plants, disused railway siding, St Philip's Marsh, Bristol, G, A.L.G. Nearby were L. purpurea (L.) Mill., L. repens (L.) Mill., L. vulgaris Mill. and L. x sepium Allman. The last three also in car park, Parkway Station, Stoke Gifford, G, A.L.G. The hybrid L. x dominii is new to the Bristol area.

Veronica scutellata L.
Ponds, Coleford, S, and at Ammerdown, S, D.E.G. and R.D.R. Also at Ammerdown Ranunculus aquatilis L., Epilobium palustre L. and Lemna polyrhiza L., D.E.G.

Orobanche rapum-genistae Thuill.
A fair number of rather small spikes (less than a foot tall) on Broom, Coleford, S, D.E.G. and R.D.R., conf. R.G.B.R.

Verbena officinalis L.
Puxton, S, P.J.M.N. Also Scutellaria galericulata L.

Mentha x gentilis L.
A robust form, almost approaching M. x smithiana R.A. Grah., roadside verge, west of Miners' Arms, Priddy, S, J.A., det. Dr R.M. Harley.

M. x verticillata L.
A form with stamens exserted, Lord's Wood, near Pensford, S, D.E.G., conf. Dr R.M. Harley. Also Epipactis helleborine (L.) Crantz, D.E.G.

Clinopodium vulgare L.
With white flowers, near Wotton-under-Edge, G, R.S.C.

Galeopsis angustifolia Ehrh. ex Hoffm.
Odd Down, Bath, S, D.E.G., conf. E.J.C.

Legousia hybrida (L.) Delarb.
Cornfield, Kilcott, G, R.S.C. Also Faulkland, S, D.E.G.

Solidago canadensis L. x S. virgaurea L.
A clump in railway cutting, Winterbourne, G, A.L.G., conf. E.J.C. This is probably the second British record of this hybrid (S. x niederederi Khek) which was shown at the B.S.B.I. Exhibition Meeting in November 1979 as new to Britain. It should be looked for where the parents grow together.

Hieracium maculatum Sm.
Derelict station, Mangotsfield, G, A.L.G. Also in disused quarry at Frenchay, G, A.L.G., up to two years ago when destroyed by residential development; this may be the site from which Miss Roper recorded this taxon (See White, Flora, p. 406).

H. strumosum (W.R. Linton) A.Ley
Conham, G, D.E.G., det. C.E.A. Andrews. This Hieracium is plentiful in Bristol streets and is the common plant of the Avon Gorge, from where it has been formerly reported under H. lachenalii and H. acuminatum, and by White, (Flora, p. 407) as H. sciaphilum var. transiens, C.M.L.

H. rigens Jord. A large number of flowering plants on disused rail track, Paulton, S, D.E.G., conf. C.E.A. Andrews. This is a first record for v.c.6 for this Hawkweed. Also on old rail track, Newton St Loe, S, R.D.R., conf. C.E.A. Andrews, comm. D.E.G.

H. salticola (Sudre) Sell & West
Locksbrook, Bath, S, D.E.G., det. C.E.A. Andrews.

H. vagum Jord.
Rail track, Locksbrook, Bath, S, and railway, Writhlington, near Radstock, S, D.E.G. and R.D.R. These records are the third and fourth for Somerset.

Crepis capillaris (L.) Wallr. var. glandulosa Druce
Malago Vale, near Bedminster, Bristol, S, I.F.G.

Alisma lanceolatum With.
Persistent on Inglestone Common, G; also at second site, in pool, Berrow, S, R.S.C., from where previously recorded (see Bristol Botany in 1976, p. 24).

Potamogeton berchtoldii Fieb.
A large patch in flower in pool, disused quarry, Emborough, S, R.S.C., conf. R.G.B.R. Also P. crispus L.

Polygonatum multiflorum (L.) All.
Many plants in hedgerows on both sides of lane, Compton Martin, S, Miss A.P. Pockson and R.M.P. Although long known from Harptree Combe, the plant may perhaps also be native in the Compton Martin site, as it was known by Miss Pockson to be present in Compton Wood up to the 1939-45 War.

P. x hybridum Brügger
Established from garden 'throw-outs' beside North Road and near the Rangers Cottages, Leigh Woods, Bristol, S, C.M.L. The specimen cited as P. multiflorum by White (Flora, p. 581) for 'Leigh Wood, 1842; Herb. R.W. Giles', which is in Hb. White (BRIST), proves to be this hybrid also, C.M.L., conf. D. McClintock.

Ruscus aculeatus L.
Adjoining Orchardleigh Lake, near Frome, S, R.S.C.

Juncus compressus Jacq.
A few small patches at margin of Chew Valley Lake, S, R.S.C. Also Typha latifolia L. and Carex spicata Huds.

J. subnodulosus Schrank
In fair quantity in rhynes, Kenn Moor, S, P.J.M.N.

Sisyrinchium bermudiana L.
Flowering and fruiting well on waste ground, Brislington Tip, S, A.C.T,

Sparganium emersum Rehm.
Glastonbury, S, and Aller Moor, near Mudgley, S, R.S.C.

Eriophorum angustifolium Honck.
Lansdown, S, D.E.G., det. R.G.B.R., growing with Oenanthe lachenalii C.C. Gmel., Anagallis tenella (L.) L., Triglochin palustris L. and Carex lepidocarpa Tausch, the last conf. A.O. Chater. E. angustifolium was known in this locality by Miss I.M. Roper in 1917 (see Bristol Botany in 1959, p. 18).

Scirpus sylvaticus L.
Coleford, S, D.E.G. Also in this vicinity Equisetum fluviatile L., Ranunculus aquatilis L., Echium vulgare L. and Valeriana dioica L.

S. setaceus L.
Cold Ashton, G, and Bitton, G, D.E.G. Also Lord's Wood, near Pensford, S, Emborough, S, Tellisford, S, Woollard, S, and Lansdown, S, D.E.G.

Carex strigosa Huds.
Streamside, Paradise Bottom, Leigh Woods, S, C.M.L. Also in plantation, Hunstrete, S, D.E.G.

C. pilulifera L.
Emborough, S, D.E.G. Also Luzula multiflora (Retz.) Lejeune and Narcissus pseudonarcissus L.

C. paniculata L.
Pond, Hunstrete, S, D.E.G. Also Ranunculus aquatilis L.

C. disticha Huds.
Edford, S, D.E.G. Also Trifolium medium L.

Poa angustifolia L.
Waste ground, New Passage, G, A.L.G. Also on Brislington Tip, S, A.L.G.

P. subcaerulea Sm.
Under-recorded in the past, this grass is widespread and abundant not only on coastal dunes but also on walls well inland. Localities include New Passage, Itchington, Winterbourne, Hambrook, Rodway Hill, Mangotsfield, many sites in Bristol, G; also Woollard, Failand and Cheddar Gorge, S, A.L.G.

Apera spica-venti (L.) Beauv.
Avonmouth Docks, G, A.L.G. and Mrs O.M. Stewart. Also Phalaris minor Retz., A.L.G.

Polypogon monspeliensis (L.) Desf.
Very fine in 1979 and 1980, disused tip, Shortwood, G, A.L.G. Also Anthemis tinctoria L.

ALIENS. Adonis annua L.
A single plant on verge of newly completed road, St Werburgh's, Bristol, G, A.L.G. Also Valerianella rimosa Bast.

Erucastrum gallicum (Willd.) O.E. Schulz
One plant on mill sweepings, Avonmouth Docks, G, A.L.G.

Malcolmia maritima (L.) R.Br.
This casual appears to be increasing. Waste ground, Yate, G, and at Avonmouth Docks, G, A.L.G.; also Brislington Tip, S, A.L.G.

Lychnis coronaria Desr.
In 1979, old tip, Lawrence Weston, G, I.F.G. Also Ribes sanguineum Pursh, Rhamnus catharticus L. and white-flowered form of Geranium molle L.

Amaranthus standleyanus Parodi ex Covas
This taxon was incorrectly reported in Bristol Botany in 1978 (pp 34, 43) as new to v.c.6 and the Bristol area. This Amaranth has been recorded for the area previously at least twice under the name of A. vulgatissimus Speg.

Geranium psilostemon Ledeb.
One large plant in old wall, Keynsham railway station, S, R.M.P., conf. E.J.C,

Impatiens parviflora DC.
A patch at side of road near the foot of Brockley Combe, S, T.G.E.

Trifolium tomentosum L.
Some 20-30 plants in lawn on sea-front, Weston-super-Mare, S, A. Byfield, conf. A.L.G. Also Medicago polymorpha L.

Colutea arborescens L.
A large shrub, disused railway sidings, St Philip's Bristol, G, A.L.G. and Mrs M.A. Silcocks. Also one plant, Brislington Tip, S, A.L.G., where seedlings, grown on and shown to be this, (T.G.E)., were found in 1978 by A.L.G. and T.G.E.

Potentilla recta L.
More than twenty plants on grassy bank at roadside, near Horseshoe Bend, Portway, Shirehampton, G, R.S.C. and A.L.G. Well established at St Philip's Marsh, Bristol, G, A.L.G., where now threatened by industrial development. Also at Conham, G, and Hanham, G, D.E.G., R.D.R. and G. Ward.

Cotoneaster salicifolia Franch.
With C. franchetii Boiss. on bank of River Frome, Moorend, G, A.L.G.

Ecballium elaterium (L.) A. Richard
Two large plants in quarry on sandstone cliff, Wick Rocks, G, D.E.G., det. E.J.C. The Squirting Cucumber is a very rare casual in Britain (see also B.S.B.I. News, Dec. 1980, No. 26, p. 16).

Polygonium sachalinense F. Schmidt
Ridgewood, Stoke Bishop, Bristol, G, I.F.G.

Rumex cristatus DC.
In Bristol Botany in 1978, p. 44, a large colony was reported on roadside, Beacon Hill, near Shepton Mallet, S, R.M.P. This record was incorrect for when seen flowering (R.M.P.) the plant was evidently Polygonum polystachyum Wall. ex Meisn.

Quercus cerris L.
Well established, Burrington Combe, S, A.C.T.

Symphytum grandiflorum D.C.
On waste ground, Congresbury, S, R.M.P.

Verbascum phlomoides L.
A single plant, Vobster, S, D.E.G.

Verbena rigida Spreng.
Two plants, Brislington Tip, S, A.L.G.

Melissa officinalis L.
Several clumps naturalized by path to Glastonbury Tor, S, R.S.C.

Campanula cochlearifolia Lam. (C. pusilla Haenke)
Established in old brick wall, Keynsham railway station, S, R.M.P., conf. E.J.C.

Anaphalis margaritacea (L.) Benth.
On floor of quarry, Emborough, S, R.S.C. Nearby was Erigeron acer L. and Calamagrostis epigejos (L.) Roth.

Erigeron mucronatus DC.
On ledge, Black Rock Quarry, Avon Gorge, G, R.S.C. and C.M.L.

Artemisia biennis Willd.
In quantity, with Chenopodium rubrum L., on foreshore, Chew Valley Lake at Hollow Brook, Bishop Sutton, S, Mrs M.A. Silcocks, det. A.L.G. Previously reported from this locality (see Bristol Botany in 1961).

Cirsium erisithales (Jacq.) Scop.
A single plant, disused quarry, Nightingale Valley, Leigh Woods, Bristol, S, C.M.L., det. Dr M.C. Smith, conf. E.J.C. Originating in University of Bristol Botanic Garden nearby; first record for Britain as an escape (see B.S.B.I. News, Dec. 1980, No. 26, p. 12).

Cicerbita macrophylla (Willd.) Wallr.
A good patch, roadside verge, Tetbury, G, R.S.C. Also against garden fences, Durdham-Down, Bristol, G, A.F.D.

Hieracium brunneocroceum Pugsl.
Quarry floor, Emborough, S, and on old railway line, Winscombe, S, R.S.C. Also quarry under Leigh Woods, S, C.M.L., conf. P.D. Sell, where known for many years, Mrs J. Swanborough.

Elodea canadensis Michx.
Flowering sparingly in rhyne, Kingston Seymour, S, P.J.M.N. The production of female flowers is reported in only few local Floras (e.g. for Berkshire, Oxfordshire, Wiltshire), but may be somewhat overlooked.

Allium carinatum L.
Long established near Stokeleigh Camp, Leigh Woods, S, R.V. Russell, comm. C.M.L.

A. roseum L.
In churchyard, where associated with native species, Westbury-on-Trym, Bristol, G, A.F.D. Long established near North Road, Leigh Woods, S, R.V. Russell, comm. C.M.L.

A. paradoxum (Bieb.) G. Don
Widcombe Hill, Bath, S, D.E.G.

Poa palustris L.
Plentiful in disused sidings, St Philip's Bristol, G, A.L.G. and R.M.P.

Bromus diandrus Roth
Widespread in Clifton Wood area, especially below south-facing walls, Bristol, G, C.M.L.

Eragrostis cilianensis (All.) Lutati
Railway line, Cumberland Basin, Bristol, G, A. Byfield, det. E.J.C. Also much Digitaria ciliaris (Retz.) Koel., A. Byfield et al.; Echinochloa utilis Ohwi & Yabuno, A.L.G. and C.M.L.; and Panicum miliaceum L , A.L.G. and C.M.L.

E. neomexicana Vasey
A single plant of this rare casual on railway line, Cumberland Basin, Bristol, G, A. Byefield, det. A.L.G.; also on Brislington Tip, S, A.L.G.

Phalaris aquatica L. (P. tuberosa L.)
A large clump of this S. European perennial plant on Brislington Tip, S, A.L.G. and R.M.P. on B.N.S. Field Meeting, conf. E.J.C. New to v.c.6 and the Bristol area.

BRYOPHYTES. Calypogeia arguta Nees & Mont.
Avon Gorge, G, M. Crundall.

Barbilophozia attenuata (Mart.) Loeske
On sandstone, Wurt Pit, south of East Harptree, S, J.A.

Cephalozia media Lindb.
Edford Wood, a small, unmanaged ancient wood near Holcombe, S, J.A.

Nowellia curvifolia (Dicks.) Mitt.
Edford Wood, near Holcombe, S, J.A.

Ditrichum plumbicola Lindb.
On a fairly bare area, Forestry Commission plantation, Stock Hill, near Priddy, S, J.A. Also at two other sites: on otherwise bare soil near old lead mine a short distance to the south, near Fair Lady Well; and among conifers in Frances Plantation, near Smitham Chimney close to lead mining south-west of East Harptree, S, J.A. This very rare moss is new to Somerset.

Seligeria acutifolia Lindb.
In 1959, on limestone pebble in pasture above West Wood, Ozleworth, G, G.W. Garlick, comm. J.A.

Orthodontium lineare Schwaegr.
In Nightingale Valley, Leigh Woods, Bristol, S, M. Crundall and members of the Bryophyte Section of the North-Western Naturalists' Union. Also Homalia trichomanoides (Hedw.) Br. Eur., and on towpath Aloina aloides (Schultz) Kindb.

Bryum caespiticium Hedw. var. imbricatum Br. Eur.
In 1977, among Carboniferous Limestone rocks, Worlebury Hill, Weston-super-Mare, S, J.A. This bryophyte is rare and a welcome addition to the N. Somerset moss flora.

B. ruderale Crundw. & Nyh.
A segregate of the B. erythrocarpum complex, top of Black Rock Gully, Avon Gorge, G, Dr H.L.K. Whitehouse.

B. flaccidum Brid.
This segregate of B. capillare Hedw. on old Ash tree, foot of Black Rock Gully, Agon Gorge, G, Dr H.L.K. Whitehouse, C. Preston et al.

B. canariense Brid.
On scree, top of Black Rock Gully, Avon Gorge, G, Dr H.L.K. Whitehouse and other members of the British Bryological Society.

Hookeria lucens (Hedw.) Sm.
Beside stream above Paradise Bottom, Leigh Woods, Bristol, S, C.M.L. In Bristol Botany in 1977 it was stated that this moss had not been recorded from Leigh Woods since early this century; however, it was collected here in 1957 by G.W. Garlick (BRIST).

Drepanocladus exannulatus (Br. Eur.) Warnst. var. rotae (De Not.) Loeske
Priddy Pools, North Hill, S, J.A. This variety is new to v.c. 6. The type D. exannulatus is known from Westhay Moor, Somerset Levels.

I thank everyone who has supplied records and helped with these, especially Mrs J. Appleyard, Mr A.L. Grenfell, Mr C.M. Lovatt and Mr P.J.M. Nethercott. I am indebted to Long Ashton Research Station for the supply of meteorological records.

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REPORT OF COUNCIL, 1981

Membership at the end of the year stood at 687 including 7 juniors.

At the AGM the Officers and Members of Council were elected with Dr J. Cowie as President.

The Annual Supper was held in April when Mr T. Bullock spoke on the local and natural history of the Frome Valley and Snuff Mills.

A publicity drive was mounted during the year with posters displayed in the Museum and public libraries, evening institutes and large firms.

The Society would like to take this opportunity of thanking the University for the help and hospitality it has received over the past years. For many years the University of Bristol has never made any charge for the use of its lecture rooms. For this, the Society is very grateful. However, the University is no longer able to provide free facilities, and starting from the autumn of 1981 the Society will pay for the hire of lecture rooms. The General Meetings are now held in the Physics Building of the University, which is easy of access by public transport and has ample parking nearby.

A proposal by Longleat Enterprises to establish a "Prehistoric Wildlife Park" at the top of Jacob's Ladder in Cheddar Gorge was rejected in March 1981 by Sedgemoor District Council. The company appealed and the Bristol Naturalists' Society was one of the objecting bodies which was represented at the public hearing in October. The Secretary of State for the Department of the Environment dismissed the appeal. This decision represents a major victory for conservationists.

The Society wishes to thank the many members who deliver the Bulletin by hand - over half are hand-delivered.

We record with regret the deaths of the following members: Mrs L.M. Fricker, Dr F.G. Jenkins, G. Poolman, A. Richardson, Mrs J.E. Swanborough, Mrs J.L. Tovey and H.W. Turner.

ACCOUNT OF GENERAL MEETINGS, 1981

January:	Presidential Address - "Remote Sensing and Natural History", by Dr J. Cowie.
February:	"A Naturalist in New Zealand", by Mr Bryan Sage.
March:	"The Avon Wildlife Trust", by Dr Andrew Lea.
October:	"Otters", by Miss E.J. Lenton.
November:	"Life in Antarctica", by Mr T. Christie.
December:	Members' Evening - "Some Rocks and their Landscapes", by Mr P. Thomson. "The Natural History of an Airfield", by Mr R.A. Burberry. "Winter Bird Distribution in Avon", by Mr R.L. Bland.

GENERAL FIELD MEETINGS 1981

Twelve field meetings and three mid-week rambles were held. Attendance was fairly good but rather uneven. A list of the meetings with leaders and an indication of things seen is given below. A fuller account is kept in the records of the Field Committee. In the following list the leader is given first, followed by the area visited.

21 Feb	Mr R.F. Curber. Slimbridge. A visit to the wildfowl collection.
4 Apr	Miss R.C. Lee. Queen's Wood, Dymock; Kempley Church, Blaize Bailey. Trees, wild daffodils (at Dymock), views (Blaize Bailey).
17 Apr	Miss R.C. Lee. A visit to the small port at Porlock Weir and a walk through the Horner Woods. Trees, plants and birds.
20 May	Mr H.G. Hockey. Algar's Manor, Iron Acton. A walk round the Nature Nature Trail along the Frome and through the gardens of the manor.
7 Jun	Mr D.A.C. Cullen & Mr B. Harper. A walk from Dolebury Warren to Burrington Combe, a visit to Charterhouse, a walk from Tyning's Farm to Rowberrow. Plants, birds, butterflies and archaeology.
17 Jun	Miss R.C. Lee. An evening walk from Upper Canada, over Bleadon Hill, to Loxton. Birds and limestone plants.
21 Jun	Miss C. Groves. The gardens and house at East Lambrook Manor and a visit to the Worldwide Butterfly Farm at Over Compton, where exotic and native butterflies are bred and there is a silkworm farm.
30 Jun	Miss C. Groves. An afternoon visit to Berkeley Castle and grounds.
5 Jul	Mrs V.J. Kenney. South Cerney. A morning walk along the old Thames and Severn Canal and an afternoon walk along a disused railway. Trees and industrial archaeology.
7 Jul	Mr A.C. Titchen. An evening walk from New Passage to Severn Beach. Plants and local history.
5 Aug	Dr A.F. Devonshire. An afternoon walk up Flax Bourton Combe. Plants and trees of limestone.
8 Aug	Dr A.F. Devonshire. Wenchford Nature Trail, Forest of Dean. The party walked around the trail and afterwards went on a tour of the forest.
9 Sep	Mrs V.J. Kenney & Dr A.F. Devonshire. An afternoon walk along the Kennet & Avon Canal starting at Bath. Plants and canal history.
26 Sep	Mr R. Curber. Titchfield Haven, Spithead. This is a county nature reserve, many wildfowl and seabirds were seen.
31 Oct	Mrs V.J. Kenney. The Cotswold Edge. A walk from Birdlip down the escarpment through Witcombe Woods and across the reservoir to Little Witcombe. Plants and birds.
14 Nov	Miss R.C. Lee. A circular walk from Failand Church through a wood. Birds and plants.

A.F. DEVONSHIRE
Hon. Field Secretary

Accounts for the Ye

1980			
	Members' Subscriptions:		
1706	Full members	2077.50	
153	Full members of the same household	178.25	
46	Corresponding members	35.50	
32	Associates	33.00	
14	Juniors	11.00	
33	Affiliated societies	30.00	2365.25
1984			
11	Donations		4.50
35	Proceedings: Grants	35.00	
60	Sales	118.14	153.14
-	Sale of journals and books		39.40
64	Field Committee: profit		-
4	Buffet Supper: profit		6.20
217	Interest on deposit account		102.22
2	Interest from National Savings Bank		2.60
42	Interest on Bonds		17.00
8	Members' contributions to the Harry Savory Illustrations Fund		79.50
65	Members' contributions to the Conservation Appeal		3.50
2	Overpaid subscription		2.50
12	Return of Junior Section balance		-
2024	Balance from last account		1063.64
£4530			£3839.45

P.J.M. NETHERCOTT
Hon. Treasurer
20 January 1982

ed 31 December 1981

1980			
610	General printing and stationery	827.84	
431	Postages and telephone	363.68	1191.52
1,921	Proceedings (1980)		983.45
147	Books	123.00	
116	Subscriptions for journals etc.	124.91	
10	Fire Insurance (Library)	15.00	
34	Book plates	-	262.91
8	Contributions to Council for Nature, SWNU etc.		7.75
24	Bristol Waterworks Co. for Chew Valley Lake Conservation		-
30	Expenses of general indoor meetings		39.20
-	Field Committee, loss on meetings		28.10
135	Grants to Sections		
	Botanical	30.00	
	Mammal	40.00	
	Ornithological	60.00	
	Geological	50.00	
	Entomological	25.00	205.00
-	Refund of overpaid subscription		2.50
	Balances to next account		
207	Cash in bank, current account	185.36	
446	Cash in bank, deposit account	548.26	
53	Deposit in National Savings Bank	55.40	
200	£200 8½% British Savings Bonds	200.00	
158	In hands of Field Committee	130.00	1119.02
	Notes: (1) Earmarked for the Harry Savory Illustrations Fund £216.44		
	(2) Earmarked for the Conservation Appeal £80.10		
	(3) These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £205.46		
	(4) £111.08 owing for postages and duplicating was outstanding at end of 1981		
£4530			£3839.45

Audited and found correct

T.B. SILCOCKS

Hon. Auditor
15 March 1982

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Audited and found correct

T.B. SILCOCKS

Hon. Auditor
15 March 1982

REPORT OF THE BOTANICAL SECTION, 1981

At the Annual General Meeting held in the Schools Room of the City Museum on 26 January, 1981, the following were elected:- President : Dr A.F. Devonshire; Secretary and Treasurer: Mr A.C. Titchen; Committee: Miss I.F. Gravestock, Mrs N. Vaughan Davies, Mrs T.B. Silcocks, Mr P.J.M. Nethercott, Dr M.C. Smith, Mr C.M. Lovatt, Mr C.W. Hurfurt and Mr A.L. Grenfell.

The following winter meetings were held:-

23 Feb	Folklore of Plants, by Dr A.F. Devonshire.
23 Mar	The Alpine Flora of Ben Lawers, by Capt. J.L.C. Banks.
26 Oct	Members' Evening with transparencies.
23 Nov	The Ecology and Flora of the Somerset Peat Moors, by Mr B. Storer.
15 Dec	Vegetable Wonders of New Zealand, by Dr M.C. Smith.

The following field excursions took place, under the leadership of those shown:-

7 Mar	Introduction to mosses, Mr G.W. Garlick.
25 Apr	Avon Gorge, Mr A.L. Grenfell (for Mr C.M. Lovatt)
3 May	Flax Bourton Combe, Dr A.F. Devonshire.
23 May	Brean Down, Mr A.L. Grenfell.
13 Jun	Great Doward, Hereford, Mr T.G. Evans.
24 Jun	Rodway Hill and Syston Common, Mr C.W. Hurfurt.
12 Jul	Portland Bill and the Chesil Beach, Mr A.C. Titchen.
21 Jul	Around the Rails, from Temple Meads Station, Dr A.F. Devonshire.
1 Aug	Congresbury, Mr P.J.M. Nethercott.
11 Aug	Lime Breach Wood, Mr A.C. Titchen.
5 Sep	Fry's Bottom and Pensford, Miss I.F. Gravestock & Mrs N. Vaughan Davies.

The Alien Survey Meeting with Mr Grenfell was cancelled due to lack of suitable sites.

During the year Mr C.M. Lovatt introduced many members to the complexities of grass identification during his course on this subject. Field trips to Durdham Down and Shirehampton Marshes were made and laboratory work was carried out in the Study Room of the Bristol University Botanic Garden.

A Botanical Section Newsletter, under the editorship of Messrs A.L. Grenfell & A.C. Titchen, was launched during the year giving reports of field meetings and items of botanical interest.

A.C. TITCHEN
Hon. Secretary

REPORT OF THE ENTOMOLOGICAL SECTION, 1981

At the Annual General Meeting B.S. Harper was elected President, G.W. Sorrell Secretary and R.W. Rowe Treasurer. Four indoor meetings were held comprising the Annual General Meeting, an evening devoted to entomological techniques, a members' evening with slides and demonstrations and a fieldwork meeting including contributions by the recorders.

The following field excursions took place:-

31 May	Shapwick Heath.
21 Jun	King's Wood and Ball Wood, nr Congresbury.
19 Jul	Forest of Dean.
15 Aug	Banner Down, nr Bath.

The monthly Leigh Woods Survey meetings were not held during 1981 but regular visits were made by individual members.

G.W. Sorrell
Hon. Secretary

REPORT OF THE GEOLOGICAL SECTION, 1981

The following officers were elected at the Annual General Meeting held on 15 January 1981 in the Geology Lecture Theatre, Queen's Building:- President: Mr P. Thomson; Vice-President: Mr V. Dennison; Secretary/ Treasurer: Mr J. Toller; Field Secretary: Dr D. Hamilton; Committee: Miss E. Pounder, Mr A.E. Frey, Mrs G. Hamilton, Mr T. Morrison, Dr A.B. Hawkins, Dr A. Mathieson and Mrs G.B. Castle.

The winter programme included:-

15 Jan	Geology and Landscapes in N. Scotland and the Northern Isles, (Presidential Address), Mr P. Thomson.
19 Feb	Geological Travels in the North American West, Dr B.P.J. Williams.
19 Mar	Geological Model Making, Mr A. Johnson.
21 Oct	Simple Field/Laboratory Techniques for the Amateur, Mr I.H. Ford.
18 Nov	Earthquakes in the Mediterranean Region, Dr P. Hancock.
2 Dec	Members' Evening.

The following field meetings were arranged:-

12 Apr	Site Recording at Observatory Hill, Dr A. Mathieson.
9 May	Steamer Trip to Steep Holm with Museum.
14 Jun	Aust Cliff, Dr D. Hamilton.
12 Jul	Burrington Combe, Miss E. Pounder.
20 Sep	Clevedon Coast Path, Dr A. Mathieson.

J. TOLLER
Hon. Secretary

REPORT OF THE MAMMAL SECTION, 1981

At the Annual General Meeting the following officers were elected:- President: Mr R.A. Burberry; Secretary/Treasurer: Mr M.A.R. Kitchen; Mammal Recorder: Mr A.F. Jayne; Committee: Mrs D. Grant, Mrs C. Kitchen, Miss E.J. Lenton, Mr J. Grant and Mr S. Nichols.

Five indoor meetings were held:-

13 Jan	Annual General Meeting and Bialowiecza Forest, Mr M.A.R. Kitchen.
10 Feb	Somerset Levels and Exmoor Otter Reports, Mr R. Jarman.
10 Mar	Rodents, Mr C. Richards.
12 Oct	Badgers after the Zuckerman Report, Mr J. Davies.
10 Nov	Flight in Mammals, Dr J. Rayner.

The following field meetings were held:-

18 Jan	Slade Wood, Caerwent, Mr & Mrs J. Grant.
28 and 29 Jan	Live trapping in Leigh Woods, Mr S. Nichols.
1 Mar	Badger Survey, Mr R.A. Burberry.
3 May	Weston Big Wood, Mr M.A.R. Kitchen.
28 Jun	Mammal Survey of Filton Airfield, Mr R.A. Burberry.
16 Jul	Bat roost visit, Mr R. Howard.
20 Sep	Mendip, Mr J. Grant.
25 Oct	Berkeley Deer Park, Mr R.A. Burberry.
15 Nov	Harvest Mouse Search, Mr A.F. Jayne.

A meeting due to be held at Bodkin Hazel Wood on 26 April was cancelled following heavy snow.

M.A.R. KITCHEN
Hon. Secretary

REPORT OF THE ORNITHOLOGICAL SECTION, 1981

Nine indoor meetings of the Section were held of which two were especially designed for beginners and one was a joint field-work meeting with the Bristol Ornithological Club. The Section was particularly honoured to be addressed by Dr C. Perrins, Director of the Edward Grey Institute in Oxford and Mr T. Prater and Mr D. Ireland of the RSPB. Thirty-two fieldwalk meetings were arranged. Unfortunately the weather was very poor for some of these meetings but there were some outstanding trips including those to Steep Holm and Kenfig.

The Section took part in a number of regional and local surveys. The national ones were (1) a BTO Nightjar study showing no evidence of breeding in Avon, (2) the BTO Winter Atlas project, including the trial run in 1980/81 and the main survey beginning in November 1981, (3) the BTO nest record scheme, (4) the Birds of Estuaries enquiry and (5) the national wildfowl counts. The local enquiries studied Birds in Gardens, Overwintering Warblers Birds of Prey in Bristol and Avon, breeding Lapwings and other waders in Avon and a trial Turtle Dove survey.

The 1980 Avon Bird Report appeared in September, this was the second year that the report had appeared with a separate illustrated cover for wider sale.

Most of the organised events were well attended, at least four indoor meetings attracted 80 members and more than half of the field trips had 20 participants. The Section has had a successful year and is looking forward to greater things in 1982.

H.E. ROSE
Hon. Secretary

REPORT OF THE LIBRARIAN, 1981

It is pleasing to report that the statistics for the use of the Library all show a gradual increase. Registered readers now total 97 and the number of visits paid to the Library throughout the year amounted to 223. Forty-eight members borrowed 284 different items.

Members of the Library Committee have continued to provide cover during Library opening hours. Two working parties were held, the second being usefully spent in tidying the runs of journals held in the University Library's store in the Wills Building.

The problem of damp has preoccupied the Library Committee in recent years, mould having been found on a number of books. We are extremely grateful to the Controller of the City Museum and Art Gallery for allowing us to borrow a dehumidifier for some time.

Forty new books were received in the Library, including donations from Mr K.T. Batty, Dr A.F. Devonshire, Dr D. Hamilton, Mrs M.M.C. Reiss, Mr S.M. Taylor and the Colston Research Society, for which we are very grateful.

Money raised by the bookstall at the Buffet Supper was used to purchase replacements of four volumes missing from the New Naturalist series.

As usual we must acknowledge our thanks to the Controller of the City Museum and Art Gallery and to the University Librarian for providing us with accomodation and storage space.

JENNIFER SCHERR
Hon. Librarian

OBITUARY : HAROLD WILLIAM TURNER, M.A. 1888-1981

Harold Turner died in Bristol on 19 November 1981 in his 94th year. With his passing the Society has lost its senior member; he joined in 1921 and was elected an Honorary Member in 1954.

Harold William Turner was born on 11 March 1888 at Droitwich and educated at Barbourne College, Worcester. From 1906-10 he was a schoolmaster in Peterborough and from 1910-16 taught at Peter Simmonds' School in Winchester. In 1916 he joined the Hampshire Regiment and saw service as a Lieutenant in France. He was severely wounded and in 1917 was invalided out on a 40% disability pension.

Following his war service Turner went to University College, Oxford where he studied Natural Sciences. Here he was taught Geology by Professor Sollas, who had from 1880-84 been Professor of Geology in the University College of Bristol, and it was to Bristol that Turner came in 1920 after obtaining a First from Oxford. He was Assistant Lecturer in Geology, then the only other member of staff besides Professor Reynolds. He later was made Lecturer and remained until his retirement in 1952. During the first two decades he was lecturer in Bristol, he carried a heavy teaching load; there being only he, Professor Reynolds (who was often abroad for long periods) and Dr Wallis who gave six lectures annually. During the 1920's Turner was Warden of Mortimer House, the second men's Hall of Residence.

For over 20 years Mr Turner was on the Governing Body of St Matthias College of Education and took a deep interest in the affairs of the college. He was also for a long time very active in the church. He was Churchwarden and Treasurer for many years of All Saints Church, Clifton and represented the laity on the Synod of the Church of England. For some years up to 1954 he was Treasurer of the South Western Naturalists' Union. It was however his participation in the activities of the Bristol Naturalists' Society that will be detailed here.

For 60 years Mr Turner was a member of the Society. He became a member in 1921 and in 1934 took on the post of Editor of the Society's Proceedings. This position he held continuously until 1951; in the following two years the Proceedings were edited jointly by Mr Turner and the late Professor Scott Simpson. Turner chaired the Publications and Library Committee (later the Publications Committee) for many years until 1967. He was President of the Geological Section in 1947 and 1948, and a member of the Geological Section Committee for many years; 1959 was his last year of service on that committee. The Society was fortunate in having Mr Turner as its Vice-President in 1948 and 1949. He served as a member of the Council of the Society continuously from 1934 until 1953, during the period of his editorship, and then served a further three years until 1956. This is a very long record of devoted service to the Society.

In assessing Mr Turner's contribution to the Society, foremost must stand his long period as editor. During his editorship many important papers appeared, such as Reynold's revision of Vaughan's 'Carboniferous Limestone Series of the Avon Gorge' and a series of papers on the marine biology of the Bristol Channel. The wealth of publication and its quality exceeded anything preceding his editorship, and indeed most which has appeared since. His editing was meticulous; in early years he used errata slips to record the smallest errors. The standing of our Proceedings owes much to Harold

Turner and it will remain a lasting memorial to him.

Turner did not himself make any published contribution to geology. He wrote up one lecture on Economic Geology of the West Country for a trade magazine and contributed three obituaries to the Proceedings; they are those of his former chiefs Professor W.J. Sollas (1936) and Professor S.H. Reynolds (1949), and later that of Mr A.H. Peach (1960). There are few records of him leading field meetings or giving lectures to the Society.

Following Miss Roper's departure about 1933, Turner involved himself actively in the reorganisation of the Society. The author recalls his very keen participation in the Council business in the mid-1950's when the Society's constitution was redrafted. He was extremely meticulous in making sure every word was exactly right, down to the last comma. Those who served with him on committees recall his charm and his depth of knowledge of the Society's business. His advice was of great value to many members.

A strict disciplinarian, Harold Turner nevertheless had a lighter side. His tendency to be pompous and pedantic was frequently overruled by a humorous touch. Turner was a man of very ample proportions, a characteristic which was often the object of raillery by students. His wife Olive was his frequent companion at University and Society activities, and her lively, jolly and outgoing personality were a foil to his more rigid image. His wife died in 1964 and there were no children of the marriage.

In later years I recall many an enjoyable hour spent chatting with him in his delightful home, the early eighteenth century Kensington Cottage in Clifton. He kept abreast of the world, carefully digesting 'The Times' daily, enjoying his Madeira and many a cigarette - all to a very ripe old age.

I am very much indebted to all those who have helped me with material for this notice, in particular to Dr W.M. Gibson, Mr Turner's cousin, and to our Treasurer, Mr P.J.M. Nethercott.

R.J.G. SAVAGE

Proceedings of the Bristol Naturalists' Society (1981), *41:* 15–20.

THE GROWTH AND ESTABLISHMENT OF MISTLETOE, *VISCUM ALBUM*

by PAUL L. SMITH

(Department of Botany, University of Bristol)

INTRODUCTION

Viscum album L. is a common plant in the county of Avon. It may be seen, for example, on specimens of *Populus* in Stoke Bishop and the Blaise Castle Estate. At Aust Cliff it parasitizes *Crataegus monogyna* Jacq. and the orchards around Pilning are quite heavily infested. White (1912) reports its presence in Leigh Woods and a long list of sites is supplied in the *Flora of Gloucestershire* (Riddelsdel *et al.*, 1948).

Results of the survey launched by the Botanical Society of the British Isles in the winter of 1969/70 (Perring 1970) showed the plant to have been recorded as a parasite on 62 species and varieties of British trees. The list of independent records is particularly long for *Acer, Populus, Malus* and *Prunus* species. One might wonder how it is that a single species of angiosperm is able to parasitize such a wide range of hosts, including members of different families, showing diverse forms of wood anatomy. Even *Tamarix*, with its soft wide cortex, has been recorded as a host of *V. album.* Obviously, the mode of parasitism must be very versatile. The aim of this paper is to elucidate some part of this versatility and to show how the parasite is equipped, both anatomically and its mode of development, to cope with the range of physical environments it must encounter when establishing itself on different hosts.

DISSEMINATION, GERMINATION AND EARLY DEVELOPMENT

The seeds of *Viscum album* are distributed by birds. Each seed is enclosed in a layer of mucilaginous material (viscin) delimited, on the outside, by a leathery coat. Viscin serves as an adhesive attaching the seed to birds eg. mistle thrush (*Turdus viscivorus* L.) and eventually to the host branch (though distribution via the faeces is probably more important). It may also aid germination by providing a moist environment around the seed. The reader is referred to Gill and Hawksworth (1961) for further details and an extensive review of the mistletoes.

In most species of *Viscum* (ca. 20 occur in the Old World), once the drying viscin has cemented the seed firmly to a surface, a green organ, the hypocotyl, emerges and grows along that surface until (assuming it to be a host branch) it reaches a suitable point for invasion. Having done so, it forms a hold fast. If this does not occur, the seedling will exhaust its food reserves and die. The factors affecting the selection of this invasion point are imperfectly known.

Tubeuf (1923) found that *V. album* will not form a holdfast on a smooth surface such as glass. According to Thoday (1951) the hypocotyl responds negatively to both gravity and light. These two responses, of which the phototropic (ie. directional growth response to light) is dominant, bring

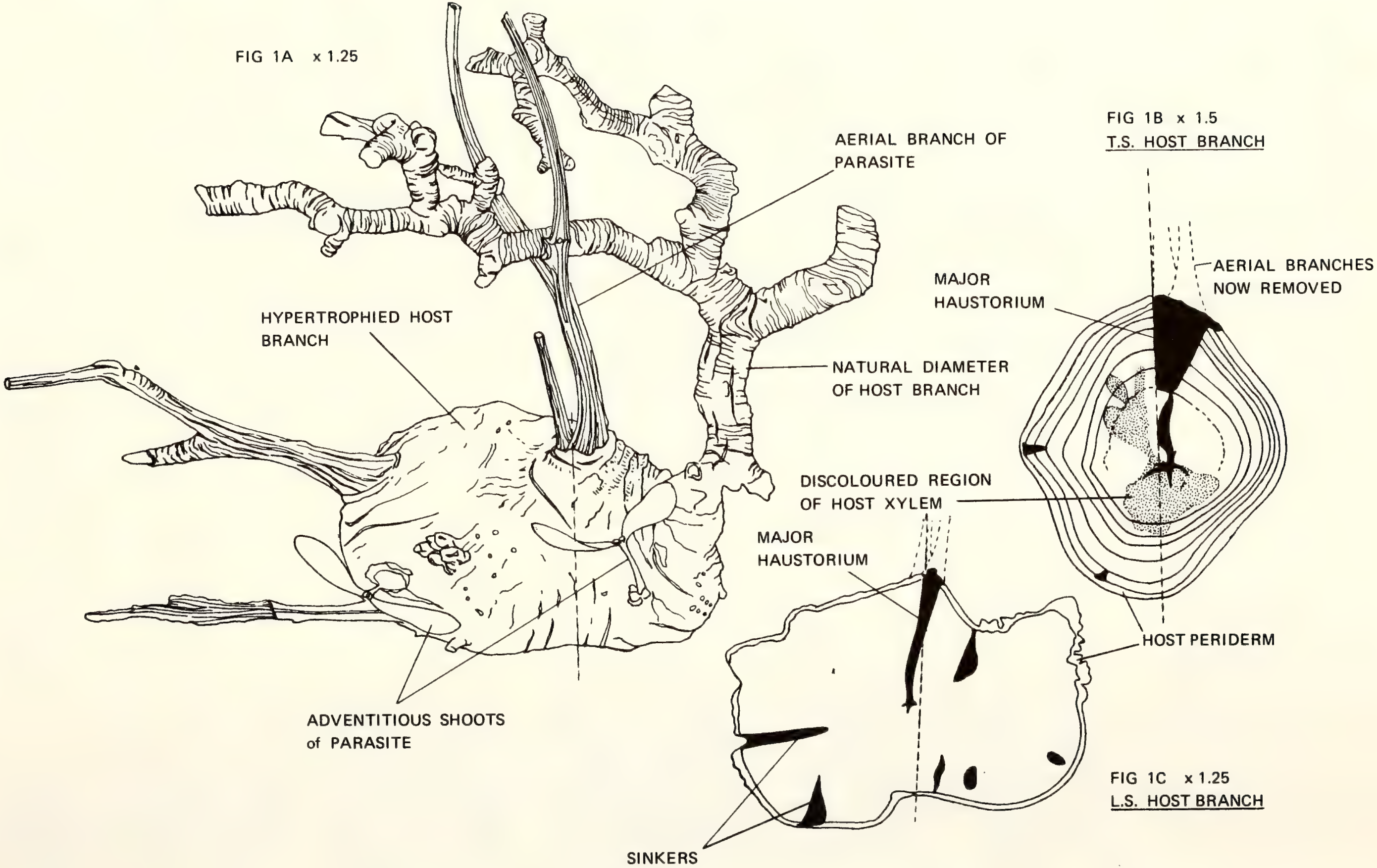
FIG 1A x 1.25
AERIAL BRANCH OF PARASITE
HYPERTROPHIED HOST BRANCH
NATURAL DIAMETER OF HOST BRANCH
ADVENTITIOUS SHOOTS of PARASITE
FIG 1B x 1.5
T.S. HOST BRANCH
MAJOR HAUSTORIUM
AERIAL BRANCHES NOW REMOVED
DISCOLOURED REGION OF HOST XYLEM
MAJOR HAUSTORIUM
HOST PERIDERM
FIG 1C x 1.25
L.S. HOST BRANCH
SINKERS

Figures 1A, B & C. Parasitized branch of a *Malus* cultivar. Cut to show detail in transverse and longitudinal section. (Dotted lines indicate respective orientation of sections).

the tip of the hypocotyl into contact with the surface of the branch, irrespective of the seed's location upon it.

The holdfast of *V. album*, according to Thoday (1951), is a dome-like structure which becomes attached to the host along its lower rim by the secretion of a viscous substance forming a firm airtight seal. The present author's observations show this structure to be 2-3 mm in diameter. Thoday describes papillae which form inside the dome and attach themselves to the host bark. Growth of the edges of the dome causes the periderm (the outer layer of host bark) to lift until a crack forms, large enough to admit the primary haustorium, the final outgrowth from the holdfast. He concluded that further penetration is accomplished by; (1) the solvent action of enzymes secreted by the tip of the haustorium, (2) tensions in the living host tissue beneath the bark, which tend, as growth proceeds, to widen a gap once it is formed, and (3) growth in thickness of the haustorium itself.

Thoday and Johnson (1930) coined the term "endophytic system" for that part of the parasite embedded within the host tissues and this has been adopted here. The establishment of the endophytic system is expained below.

HAUSTORIUM AND CORTICAL STRANDS

To aid interpretation of the following discussion the locations of the four most important tissues seen in sections of a normal host branch are shown diagrammatically in figure 2.

FIG 2

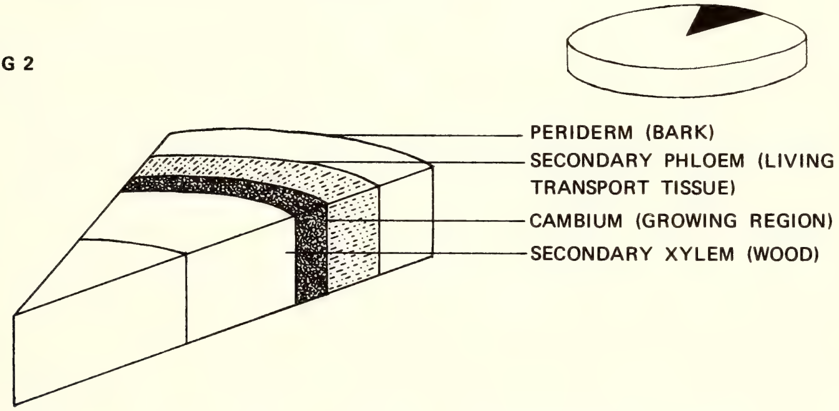

Figure 2. Stereogram of a tissue wedge from the branch of a broad-leaved tree.

It seems that the primary haustorium of the parasite can only invade the softer tissues of the tree and thus it penetrates only as far as the secondary xylem. This means that it is now surrounded at its tip by the meristematic tissue (cambium) from which all other host tissues are formed. In this position the haustorium is subject the same physiological and biochemical influences as that tissue and, perhaps as a result of this, a contiguous meristem is induced within the parasite (see fig. 3C). From then on, growth of the parasite simply keeps up with that of the host and, over the course of time, as the girth of the host branch increases, so a wedge-shaped haustorium is produced, embedded within the new host xylem (see figs. 3A-3D). Thus the mistletoe grafts itself onto the host and eventually shows growth rings continuous with those of the tree (fig. 3D).

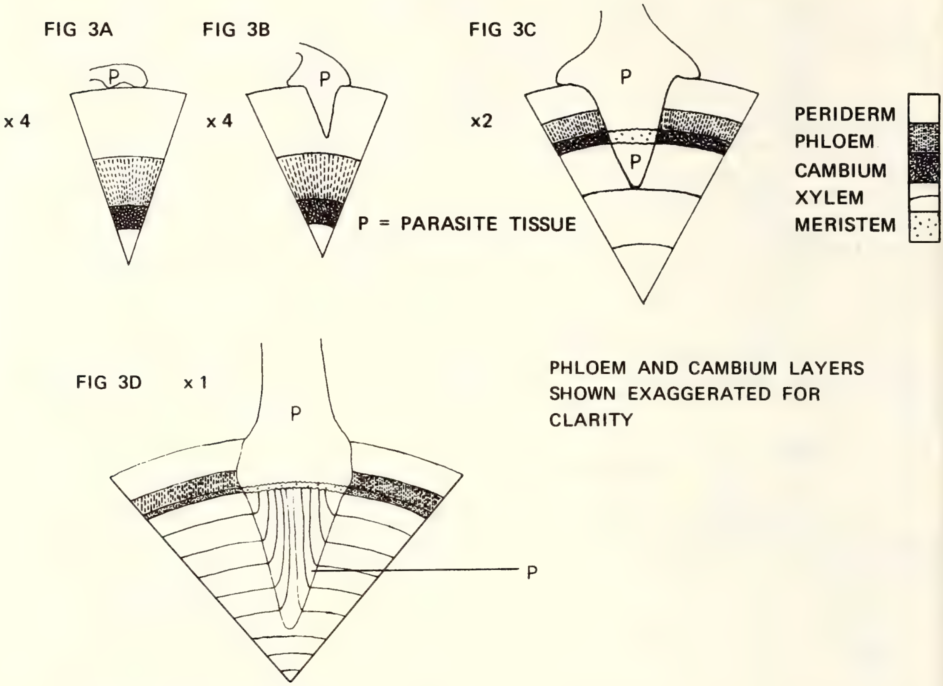
FIG 3A
x 4
P
FIG 3B
x 4
P
FIG 3C
x2
P
P
P = PARASITE TISSUE
PERIDERM
PHLOEM
CAMBIUM
XYLEM
MERISTEM
FIG 3D
x 1
P
P
PHLOEM AND CAMBIUM LAYERS SHOWN EXAGGERATED FOR CLARITY

Figures 3A-3D. Simplified transverse sections of a host branch (only wedges shown) illustrating stages of infection by *V. album*.
(3A) Holdfast formation.
(3B) Initial penetration of host periderm.
(3C) Establishment of parasite meristem and first years growth.
(3D) Haustorium showing growth rings (seen in L.S.) continuous with those of host (seen in T.S.).

The primary haustorium also gives rise to lateral outgrowths which elongate to become cortical strands, growing through the soft outer tissues of the host and making contact with the cambium at intervals thus giving rise to new supplementary haustoria known as sinkers. The aerial shoot system of the parasite usually develops predominantly above the major haustorium with smaller adventitious shoots above the sinkers.

It has long been known that the primary haustorium serves to draw off water and mineral salts, especially nitrogenous ones, from the host wood such that the parasite need only produce its own carbohydrates, by photosynthesis. There is some evidence that release of carbohydrates from the parasite to the host may also occur (Gill and Hawksworth 1961). As is often the case, the distinction between parasitism and mutualism is a fine one.

HOST RESPONSES

The responses of the host to infection by mistletoes have been reviewed by Gill and Hawksworth (1961) and discussed by Kuijt (1969), Srivastava and Esau (1961 a & b), Thoday (1951, 1956, 1957 and 1958) and Tubeuf (1923). However, only those of field interest will be considered here. Various trees infected by certain mistletoes have been seen to retain their leaves longer in autumn than uninfected trees of the same species. this suggests the occurrence of a hormonal disturbance within the host.

In cases of infection by all but the most diffuse of endophytes a certain amount of abnormal growth, or hypertrophy, is apparent in the host branch concerned (see figures 1A, 1B and 1C for an example). The physical presence of the endophyte accounts for some of this swelling but much of it is due to an abnormal activity of the host cambium (Kuijt 1969). Stimulation of host cambial activity is particularly noticeable on the proximal (with respect to the host trunk) side of, and on the flanks of the haustorium (Thoday 1958). In *Crataegus*, Thoday (1951) reported that hypertrophy was evident, whereas abnormal growth of the branches of *Tilia* and *Acer* was reported, by Dallimore (1932, in Gill and Hawksworth 1961), to develop only after the infection by *V. album* declined in vigour.

The present author's observations suggest that the regions of maximum disturbance to host growth are correlated with the location of the cortical strands within the host periderm and underlying secondary phloem. This might suggest a causal relationship.

Invasion of the host's tissues by a parasite of similar angiospermous physiology and with similar growth processes might be expected to cause some disturbance to their subsequent development. However, considering the structural nature of the association, it might be the case that hypertrophy of the host tissues is actually advantageous to the parasite. Certainly an increased amount of host vascular tissue might serve to increase the efficiency of transport of solutes to the endophyte. More likely however, is the suggestion that increased xylem production might serve to strengthen the "graft-union" thus helping to counteract the weakening caused by the discontinuity in the host's tissues. Were this shown to be the case then one function of the cortical strands might be to induce such a strengthening effect. Neither party would benefit if the host branch was so weakened that it broke at the graft. The mistletoe would stand to lose its habitat and the tree would lose photosynthetic tissue. Put teleologically, a good parasite looks after its host.

Another type of growth disturbance which may be observed is end-death of the infected host branch distal to the parasite. The present author has observed this only in branches of small diameter (ca. 5 cm) and a conflicting observation was made in an old specimen of *Acer campestre* L. (still present in the Robinswood Hill Country Park, v.c. 33, at the time of writing). Most of the tree in question was dead (probably from old age) and certain branches were seen to have lost their bark. In fact the only living branches were those heavily infected with *V. album*. This observation together with that of delayed autumnal abscission referred to earlier, supports the idea that *V. album* may retard host senescence. Perhaps this occurs, as suggested by the occurence of hypertrophy, through the alteration of its hormone balances. However, this requires corroborative evidence. The conflict between the idea of delayed senescence and the occurrence of end-death in some cases is not too difficult to explain. If a beneficial effect were induced by the parasite it might never be expressed in branches infected while still young because their transport tissues would simply be insufficient to cope with the added water and mineral stress induced by the mistletoe.

The various forms of hypertrophy and end-death may be seen, on suitable hosts, in and around Avon. Observations concerning the possibility of delayed senescence are easily made and I hope that this short discussion will inspire some readers to examine this familiar plant more closely.

ACKNOWLEDGEMENTS

I am grateful to Mrs P. Cocksedge, Mr and Mrs C.H. Smith and Mr G. Walden for the supply of living material used in this investigation, and to Dr D. Gledhill for his supervision.

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ONE HUNDRED YEARS OF UNIVERSITY BOTANIC GARDENS

by D. GLEDHILL

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In 1882, Frederick Adolph Leipner planted the first Botanic Garden with 509 plants and 247 packets of seed, which were purchased from a grant of £15 and donations which raised the total to £89/15/4½. The Leipner garden occupied the triangular site at the top of University Road, now occupied by the New Wing of the Departments of Botany and Zoology, the Zoology Physiology Building, the Animal House and a car park. The only certain traces of the former garden are the *Ginkgo* tree on the University Road side and a small greenhouse, still in use, which was donated by Miss I. Worsley in 1913.

Gardening classes for the Day Training College for Women were taught at the garden from 1912. The laboratory/greenhouse donated by Mr Hiatt Cowles Baker in 1913 was both a vital asset and a prominent feature which gave service until 1956. Otto Vernon Darbishire, who became Professor of Botany in 1919, and Macgregor Skene, who succeeded him in 1934, were both responsible for active development of the garden and Macgregor Skene leaves us this description of it in 1936:- "the triangular area next the N Wing with systematic beds, pond, rockeries, ecological beds. In this, besides the Hiatt Baker lab., there was a small cold greenhouse used for the culture of algae etc.; a greenhouse for general material with a compartment for stove plants; a range of two greenhouses used for propagating and ferns. Potting shed and gardeners's office; range of storage sheds; sunk pit used for mushrooms or storage".

From a few photographs and the site plan for the impending building of the New Wing the layout of the garden can be reconstructed, as in the first illustration.

Intrusion of the New Wing (1939-40), Physiology Laboratory (1949-50) and Animal House (1953) required the development of another site as a Botanic Garden and the demise of the Leipner garden was final when the last of its buildings were demolished and the remaining area covered with tarmacadam in 1959-60. Fortunately the department had a suitable area conveniently close by, in the Field Garden.

H.H. Wills had obtained a plot of land, of three-fifths of an acre, and had given it to the University for use as a Field Garden in 1917. This was the plot now occupied by the Senate House, between Tyndall Avenue, Woodland Road and St Michael's Park. At first, half the area was put to use as allotments and not until 1927 was planting started and a greenhouse and store built in it. Again, we have Macgregor Skene's account of it in 1935:- "with systematic beds, conifer bed, shrubbery, school garden plots and situated in it an experimental greenhouse and a store shed". The following year he re-planned it to include order beds, pond, rockeries, herb garden and a concrete greenhouse.

Hiatt Cowles Baker died in September 1934 and his will included a bequest of £5000 to the University to provide interest for the upkeep of the Botanic Garden. In recognition of his devoted service to the University, Mr Gordon Hake was commissioned to design the semi-circular, stone memorial which was placed in the Field Garden late in 1939. The garden was then renamed as the Hiatt Baker Memorial Garden.

From the site drawings, preparatory to the building of Senate House, it is possible to reconstruct the layout of this garden as it was in 1958-59. The only remnants of its former beauty are the two trees opposite the Hawthorns Hotel. No trace has been found of a commemorative tablet which was to have been placed 'on or in' Senate House to proclaim the earlier use of the site.

In 1959, the Hiatt Baker Memorial Garden was relinquished for the building of Senate House. There was no site close to the Botany Department on this occasion, although it did have 700 square yards of the Nursery Garden behind Stuart House. The Botanic Garden had to move to Bracken Hill, Leigh Woods.

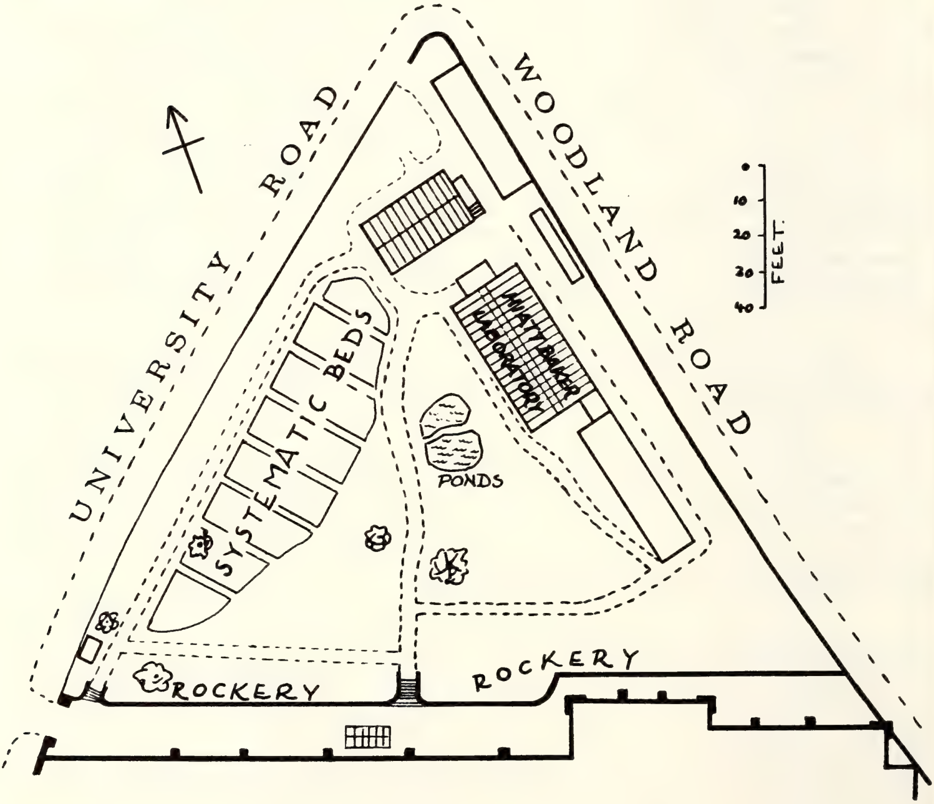

Figure 1. The Leipner garden from 1937 plan of G.H. Oakley.

Bracken Hill was the home of Walter Melville Wills and was donated to the University by Captain R.D.M. Wills in 1947, "for furthering research ... and teaching of ... Agriculture, Arboriculture (and) Horticulture ...". It had been used during the war by the Ministry of Agriculture and afterwards for a Graduate Course in Horticulture. In August 1959, removal of plants from the Hiatt Baker Memorial Garden started and the Hiatt Baker Memorial was re-sited in the formal rose garden. The donation was of Bracken Hill, with its immediate grounds, the formal garden, which had been subject to a peppercorn rent, and the present nursery area and wood, in which there was then a thatched barn/apple store.

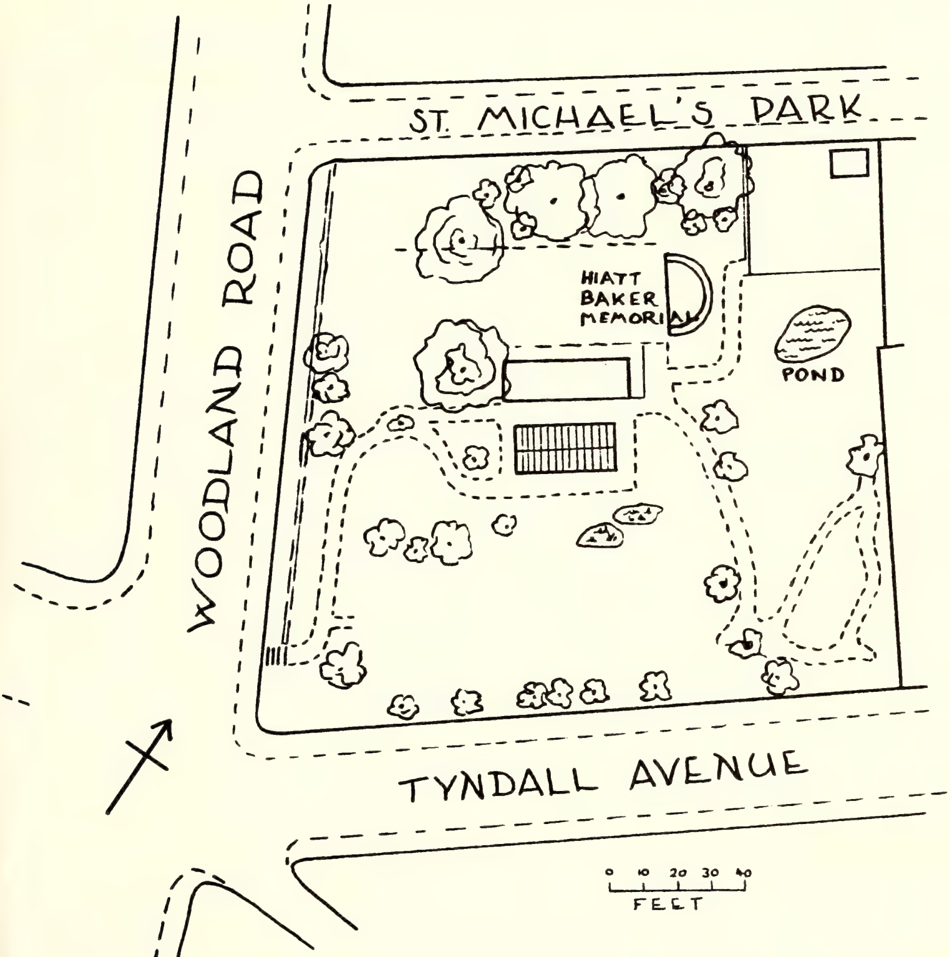
ST. MICHAEL'S PARK
WOODLAND ROAD
HIATT BAKER MEMORIAL
POND
TYNDALL AVENUE
0 10 20 30 40
FEET

Figure 2. The Hiatt Baker Memorial Garden 1958-59.

Development at Bracken Hill was favoured by the range of features which it already contained - rockeries, ponds, greenhouses and mature trees, but its remoteness from the Department did not favour its full exploitation. The real momentum for development followed the formation of the Association of Friends of the Botanic Garden and a commitment to schools visits, teaching courses in Botany and courses in Horticulture. The garden is now as widely known to the Bristol community as was the Leipner garden when Darbishire opened it to the public on Tuesday and Friday afternoons in 1913. At this time of economic recession the Botanic Garden is expanding its activities and flourishing.

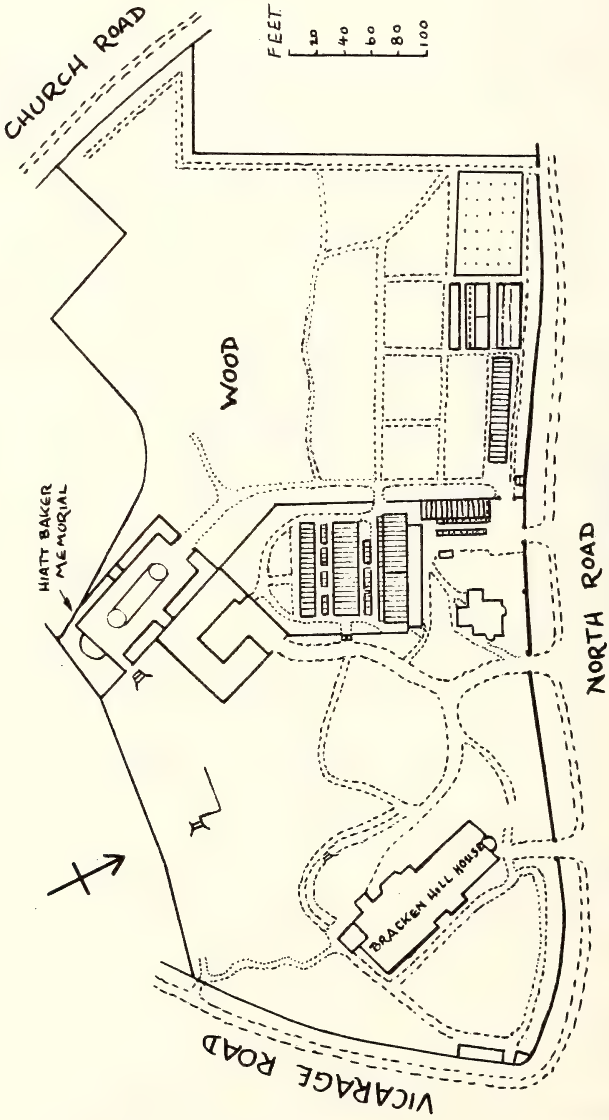
CHURCH ROAD
FEET
20
40
60
80
100
WOOD
HIATT BAKER MEMORIAL
NORTH ROAD
BRACKEN HILL HOUSE
VICARAGE ROAD

Figure 3. The Bracken Hill Botanic Graden, Leigh Woods.

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FURTHER FIELD EVIDENCE OF THE AGE AND ORIGIN OF THE LEAD-ZINC-SILICA MINERALIZATION OF THE MENDIP REGION

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ABSTRACT

In Lulsgate Quarry, 10 km southwest of Bristol, an extensive calcite vein bearing some galena passes from Carboniferous Limestone up into Liassic conglomerates with no change of character. At Egford, near Frome, the Inferior Oolite is heavily silicified, with a basal replacement bed of sphalerite and galena. It is proposed that the mineralization was associated with the final (Jurassic) stages of rifting that began in Permian times in the Somerset area. The Harptree Beds of the Central Mendips are thought to be residual deposits formed by leaching of incompletely silicified limestones, as seen at Egford.

INTRODUCTION

The first geologists who studied the lead-zinc mineralization of the Mendip-Bristol region believed that the ore veins in the Carboniferous Limestone "were contemporaneous with the Cornish Hercynian mineralization and arose from emanations given off from an igneous mass" (Dewey 1921 p.65). Dewey recapitulated the views of Buckland and Conybeare (1824) and Woodward (1876) that the ores found in post-Carboniferous rocks, especially the Dolomitic Conglomerate, were derived from these veins, either as eroded detritus, or in solutions formed by chemical weathering. Moore (1867) had noted the association of lead ore with Jurassic fissure deposits, but Woodward had argued that the Jurassic material must have penetrated the ore veins in later periods, possibly during the Ice Age.

Modern workers, e.g. Dunham (1952), took account of the growing number of reports of mineralization in Mesozoic rocks. Green (1958) even suggested that a Tertiary age was possible. Moorbath (1962) calculated lead isotope ages that indicated a mid-Permian to late Triassic age for the lead mineralization, but Ford (1976) questioned the validity of such calculations and argued that the main Mendip mineralization was Jurassic, of Mississippi Valley type. In recent years, Alabaster (1975, 1976) and Curtis (1981) have found and described post-Triassic lead-zinc mineralization in the eastern Mendips and north of Bristol.

It can be argued that all the sites where mineralization is clearly of post-Triassic age are outside the main mining areas (where the ore was in Carboniferous or Triassic rocks), and are therefore of doubtful significance. Conversely, it must be pointed out that Jurassic rocks are rare in the orefields, so that the relationship is seldom seen. The observation by Moore (1867) that Lower Lias clay occupying a fissure deep in the Charterhouse orefield contained 7% Pb in the form of disseminated galena is therefore of great importance.

Of the two occurrences described here, the first is an example of post-Triassic mineralization in a minor orefield (Broadfield Down) and the second throws some light on the origin of the siliceous Harptree Beds.

GALENA VEIN IN LULSGATE QUARRY

Lulsgate Quarry (ST 516658) lies immediately east of the A38 trunk road some 10 km southwest of Bristol, in the central area of Broadfield Down. The main part of the quarry is in Carboniferous Limestone with a regular easterly dip of about 20°, but in the northeast corner is a 7 m thick sequence of limestone breccia-conglomerates, well and subhorizontally bedded, that rests on the Carboniferous Limestone with sharp unconformity. These conglomerates are of White and Blue Lias age, according to the I.G.S. maps of the region.

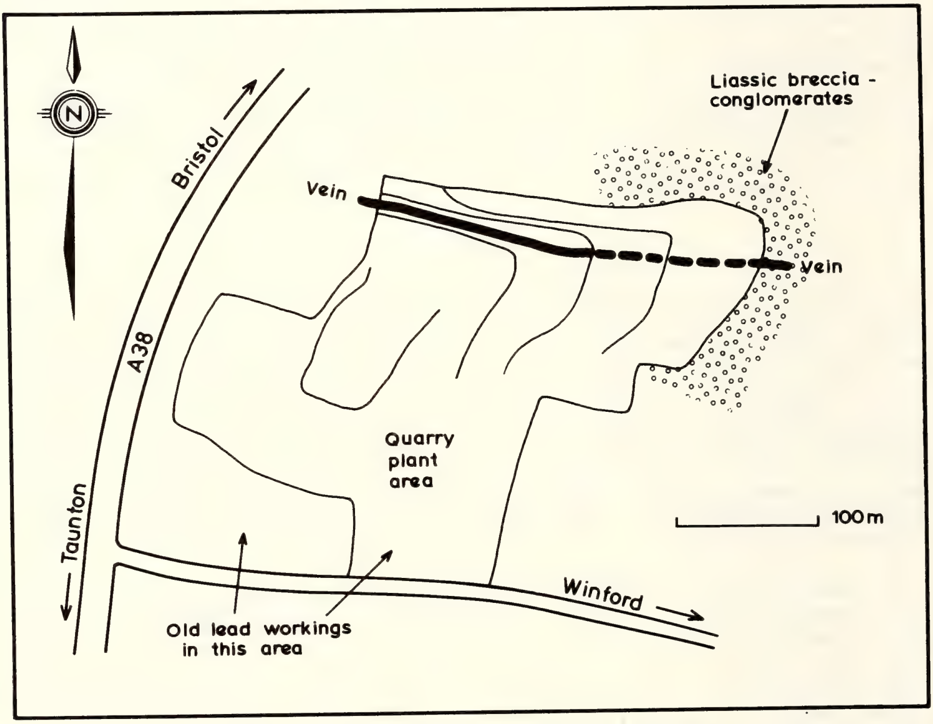
N
Bristol
A38
Taunton
Winford
Vein
Vein
Liassic breccia - conglomerates
Quarry plant area
100m
Old lead workings in this area

Figure 1. Sketch map of Lulsgate Quarry.

Along the north face of the quarry, at a low level, the Carboniferous Limestone is cut by a vertical calcite vein from 0.2 m to 0.4 m thick, trending slightly south of east, that is exposed almost continuously over a distance of 100 m. Several phases of calcite outgrowth and encrustation can be distinguished. The earliest outgrowths were based on the Carboniferous Limestone walls, or on a thin discontinuous neptunian dyke of fine-grained greyish yellow limestone, probably of Lower Lias age. Galena is present as widely separated crystals and small blebs occupying a position between two phases of calcite encrustation. There are local patches of limonite and yellow ochre, apparently formed by the weathering of pyrite stringers that were emplaced in a simliar position to the galena.

At the east end of the quarry, at a high level, the east face is cut from top to bottom by a vertical multiphase calcite vein about 0.4 m wide with the same trend and in the same line as the vein already described. Continuity between the veins cannot be proved because exposures are lacking. The face is about 8 m high, with Lias conglomerates forming the top 7 m. The calcite vein cuts straight across the unconformity. Galena is present in the calcite above and below the unconformity, rather more plentifully than in the low-level vein, in a position between phases of calcite outgrowth.

Other smaller calcite veins cross the unconformity and some of them are displaced up to 1 m along bedding planes in the Lias, showing that the limestone conglomerates had consolidated into strong coherent beds by the time the fissure gaped open. There is no significant vertical displacement on any of the veins.

The importance of this occurrence is that it is in an area of considerable mining activity. The I.G.S. six-inch maps Sheets ST56NW and ST56SW show lead working to north, west and south of Lulsgate Quarry, the closest being at the south edge of the quarry which actually intersected one mineshaft. Many worked veins trend more or less parallel to the one described. In addition, silicified Rhaetic and Lias strata (Harptree Beds) are present northwest and southeast of the quarry. Unlike other areas of Avon and Somerset where mineralization is demonstrably of post-Liassic age, this area can properly be called an orefield, albeit a minor one compared to those of the Central Mendips.

MINERALIZED UPPER INFERIOR OOLITE AT EGFORD

In the period 1974-1980, Wessex Water Authority core-drilled 31 groundwater observation boreholes in the eastern Mendips. One of these, beside the Nunney Brook at Egford, 1 km west of Frome (ST 75744848), showed the following section:

0 m to 4.5 m	Fuller's Earth grey calcareous clay
to 16.0 m	Upper Inferior Oolite mineralized limestone
to 18.5 m	Lias grey silty mudstone
to 45.5 m	Carboniferous Limestone (Black Rock Limestone) pink and grey crinoidal limestone with thin shale bands, bedding dips 10°; 4 thin composite steeply dipping neptunian dykes.

There was no visible mineralization in any formation except the Inferior Oolite. The oolitic and calcarenitic limestone of this formation was largely replaced by grey and black chert, the degree of silicification being estimated as 60% at the top of the Oolite, increasing to about 95% at the base. There had been some contemporaneous fracturing of the chert, the cracks being usually filled with chert of a different colour; rarely with calcite.

The chert mass was locally cavernous where remnant limestone patches had been partly leached out, and small crystals of galena, pyrite, sphalerite and barite were present in some of the cavities. At the base of the formation was a layer 150 mm thick of particularly coarse-grained calcarenite, the matrix of which had mostly been replaced by sphalerite, with subsidiary galena and barite.

Moore (1867, p. 488) noted lead-zinc-barite mineralization in the Inferior Oolite and Carboniferous Limestone in the Nunney Brook valley both north and south of Egford, and he described a partly silicified and mineralized neptunian dyke in a nearby quarry.

An extensive fault with an east-west trend and a post-Inferior Oolite downthrow of c. 10 m to the south at Egford, crosses the Nunney Brook close to the borehole, according to the one-inch geological map sheet 281 (Frome), but the fault plane is not exposed. It could have been the feeder channel for ore solutions that rose until, faced with a thick cap of Fuller's Earth clay, they migrated laterally into the Inferior Oolite. Judging by the way the ore and silica in this formation occur as replacement masses rather than as fissure fillings, the Oolite may not have been fully lithified at the time of mineralization. Alabaster (1976) observed wall rock replacement by lead-zinc minerals and silica beside small fissures in the Inferior Oolite at Whatley Quarry, 3 km west of Egford.

Alabaster (1976) also remarked on the close mineralogical similarity between patches of silicified Inferior Oolite at Whatley Quarry and the siliceous Harptree Beds of Central Mendip. He outlined two possible sources for the silica: ascending hydrothermal solutions, as proposed by Woodward (1893) and expanded by Green and Welch (1965); or descending cold solutions containing silica leached from the overlying Fuller's Earth mudstones. The Egford borehole shows much more intense silicification than is seen at Whatley, and provides a basis for further consideration of the nature and origin of the Harptree Beds.

UNWEATHERED HARPTREE BEDS IN THE EGFORD BOREHOLE

The Harptree Beds of the Oakhill - Harptree area of the Central Mendips, and of the Lulsgate area, are variously described as "brown loam or clay full of large blocks of chert", "massive bedded cherts", "compact cherts resting on sandy beds, with local breccias", "bands of chert separated by bands of ochreous clay" or "coarse granular grit forming a thin broken-up skin on the surface of the Carboniferous Limestone" (Green and Welch 1965, Woodward 1876). Around the edges of the outcrops, where there is lateral passage from Harptree Beds into Jurassic limestones (Downside Stone), the latter contain cherty patches, and the Dolomitic Conglomerate of the same districts is affected by local silicification (Green and Welch 1965).

Barrington and Stanton (1977 p. 223) recognised that the Harptree Beds of the type areas are not a true formation, but a residual deposit formed by the decalcification of partly silicified limestones. The present configuration and altitude of the Mendips are the result of Tertiary peneplanation followed by periglacial stripping of their envelope of soft Keuper, Lias and Fuller's Earth clays, combined with solutional lowering of exposed limestone surfaces at a mean rate of about one metre in 20,000 years (Barrington and Stanton 1977 pp. 217-9). The partially silicified Lias and Inferior Oolite limestones of the Central Mendips and Broadfield Down must have become subject to dissolution in the early and middle Pleistocene. Areas of intense silicification were but little affected by decalcification, retaining their coherence and orientation, as at Wurt Pit (Green and Welch 1965 p. 108). Most of the limestones were less heavily silicified, and decalcification produced a shrunken incoherent residual mass of jumbled chert blocks of all sizes set in clay. Silicified limestones of the Egford borehole type would, when decalcified, produce massive cherts like those of Wurt Pit, while those of Whatley Quarry type would form a thin gritty loam with scattered blocks of chert. If the Inferior Oolite of the Whatley - Egford region is ever exposed and decalcified, a new area of Harptree Beds will appear on the geological maps.

Of the two possible modes of silicification outlined by Alabaster (1976) and summarised above, the hydrothermal mode is preferred because of the close spatial and mineralogical links of all known occurrences of actual and potential Harptree Beds with post-Liassic lead-zinc mineralization (Figure 2). If the silica were derived from overlying mudstone strata it would surely be found in regions without metallic mineralization.

AGE AND ORIGIN OF THE MENDIP LEAD-ZINC MINERALIZATION

The work of Moorbath (1962), mentioned above, provided apparently compelling evidence that the main Mendip lead-zinc mineralization was Permo-Triassic. With his age determinations discounted, there is now no particular reason to suppose that more than one phase of lead-zinc mineralization affected the Mendip region, nor that it began much before the deposition of the Fuller's Earth rock, the youngest stratum in which galena is found in the Mendip area (Dr G.A. Kellaway, *pers. comm.*).

Ford (1976) was the first modern worker to firmly propose a Jurassic age for the main Mendip mineralization (although Moore (1862) had been perfectly sure that it was Jurassic). Comparing it to the mineralization of the South Pennines, Ford argued against the conventional view that the ore fluids had a deep-seated source, because of the lack of any significant mineralization in strata underlying the Carboniferous Limestone and because there is no evidence of the presence of a buried granite or other such basement structure. He suggested instead a Mississippi Valley type origin: lateral migration of the ore fluids under an impermeable cap of Keuper Marl and Lias clay, from distant sources. These were, he believed, the Carboniferous Limestone and Culm Measures in the deeply buried Carboniferous basins south, east and west of the Mendips. Compaction and compression in these basins would have caused expulsion of formation waters along the fault network towards structurally high points, of which the Mendips were the largest, where the cap rocks were thin or absent and the fluids could deposit their load and escape.

While Ford's hypothesis offers an explanation of certain spatial anomalies such as the prevalence of zinc ores on the west and north sides of the Mendip ridge and that of lead ores elsewhere, it is not trouble-free. If the Mendip mineralization is indeed Jurassic (unlike the Permo-Triassic mineralization of the South Pennines), one must ask why the formation waters were not lost during the intense Hercynian tectonism, metamorphism, recrystallization and erosion suffered by the Carboniferous strata of the Southwest Province (unlike the Pennines). Also, how did the northward-moving solutions from the greatest (southern) Carboniferous basin manage to pass the deep trough of the Central Somerset rift valley (Whittaker 1975)? Ford's diagrammatic cross-section (1976, Fig. 11) is oversimplified in this respect. Such metalliferous mineralization as is known in the Paleozoic rocks of the

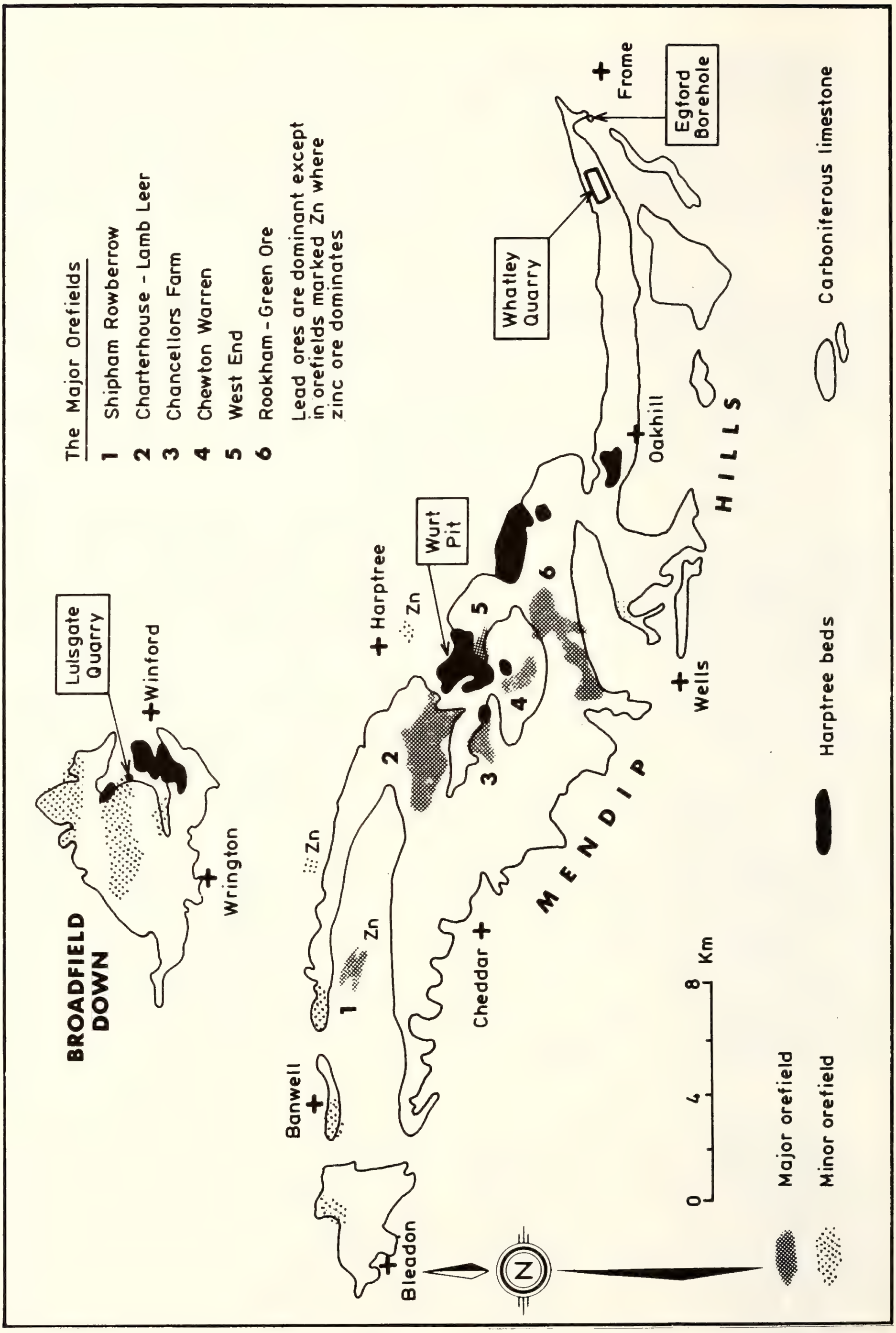
The Major Orefields
1 Shipham Rowberrow
2 Charterhouse - Lamb Leer
3 Chancellors Farm
4 Chewton Warren
5 West End
6 Rookham - Green Ore
Lead ores are dominant except in orefields marked Zn where zinc ore dominates
BROADFIELD DOWN
Lulsgate Quarry
Winford
Wrington
Harptree
Zn
Wurt Pit
Whatley Quarry
Egford Borehole
Frome
Oakhill
Wells
MENDIP
HILLS
Cheddar
Banwell
Bleadon
N
0
4
8
Km
Major orefield
Minor orefield
Harptree beds
Carboniferous limestone

Figure 2. Individual orefields of the Mendip district in relation to outcrops of Harptree Beds.

Quantock-Cannington massif on the south side of the rift valley consists mainly of copper ores (Hamilton and Lawrence, 1970), which are extremely rare in the Mendip region.

According to Whittaker (1975), the Central Somerset rift valley was part of a system of rift valleys that were actively forming in southern Britain during the Permian, Triassic and early to middle Jurassic, in response to prolonged crustal tension. The Somerset rift valley trends roughly ESE-WNW between the Mendips and the Quantocks, and runs out into the lower east - west section of the Bristol Channel. Its axis coincides with that of the Glastonbury syncline. Its centre subsided to a depth of at least 1.5 km, possibly much more.

Concurrently with the later stages of rifting, repeated adjustive movements on wrench faults, and step faulting on strike faults, opened tension gashes that became neptunian dykes with fillings of Keuper to Lias age (Stanton, in prep.). These dykes share with the rift valley a dominantly east - west to southeast - northwest trend, although some follow the north - south wrench faults. They occur abundantly in some of the East Mendip quarries (e.g. Whatley, Holwell and Cloford quarries), usually associated with important faults, and can be seen in many places in the Charterhouse - Lamb Leer orefield (the only major Mendip orefield that is still fairly well exposed). The pattern of a neptunian dyke swarm is sometimes remarkably similar to the pattern of mineral veins in an orefield (Fig. 3).

It is common for Mendip's neptunian dykes to show evidence of repeated gaping. The Keuper dykes of red marly limestone are split by Rhaetic and Liassic dykes of grey marl, limestone and coarse calcarenite (Downside Stone), and the composite mass is again split by one or more phases of calcite veining. In Keuper and Lias times the Carboniferous Limestone outcropped; thus in episodes of gaping the fissures reached the ground surface or the sea bed and were easily filled with locally available sediment. After Inferior Oolite time, when the Mendips were buried beneath Fuller's Earth and later clays, gaping in the Carboniferous and other less coherent limestones did not extend up to the surface, so the fissures remained open and available for the passage of fluids.

The majority of Pb-Zn-Fe sulphide veins that can at present be seen in quarries in the Mendip region (e.g. Lulsgate, Whatley, Holwell quarries) are associated with neptunian dykes in the Carboniferous Limestone, and in all such cases the sulphide-bearing calcite veins transect the Keuper to Lias fillings. Away from the quarries, Moore's (1867) record of galena permeating the Lias dyke at Charterhouse is equally significant.

If the fractures containing ore veins and neptunian dykes in the Mendips are mostly pull-aparts, of tensional origin, a satisfactory explanation is provided of their typically irregular, discontinuous and shallow-seated nature. They contrast sharply with the extensive and regular "rakes" of Derbyshire, which follow wrench faults (Ford 1976).

It is here proposed that, in view of the close temporal and spatial association of the Pb-Zn-Fe sulphide ore deposits of the Mendip region with neptunian dykes, that are themselves a manifestation of Permian to Jurassic rifting, the possibility that the ore fluids were generated as a result of that rifting should not be ignored. If so, they rose from great depths up faults associated with the later stages of rift valley formation, and

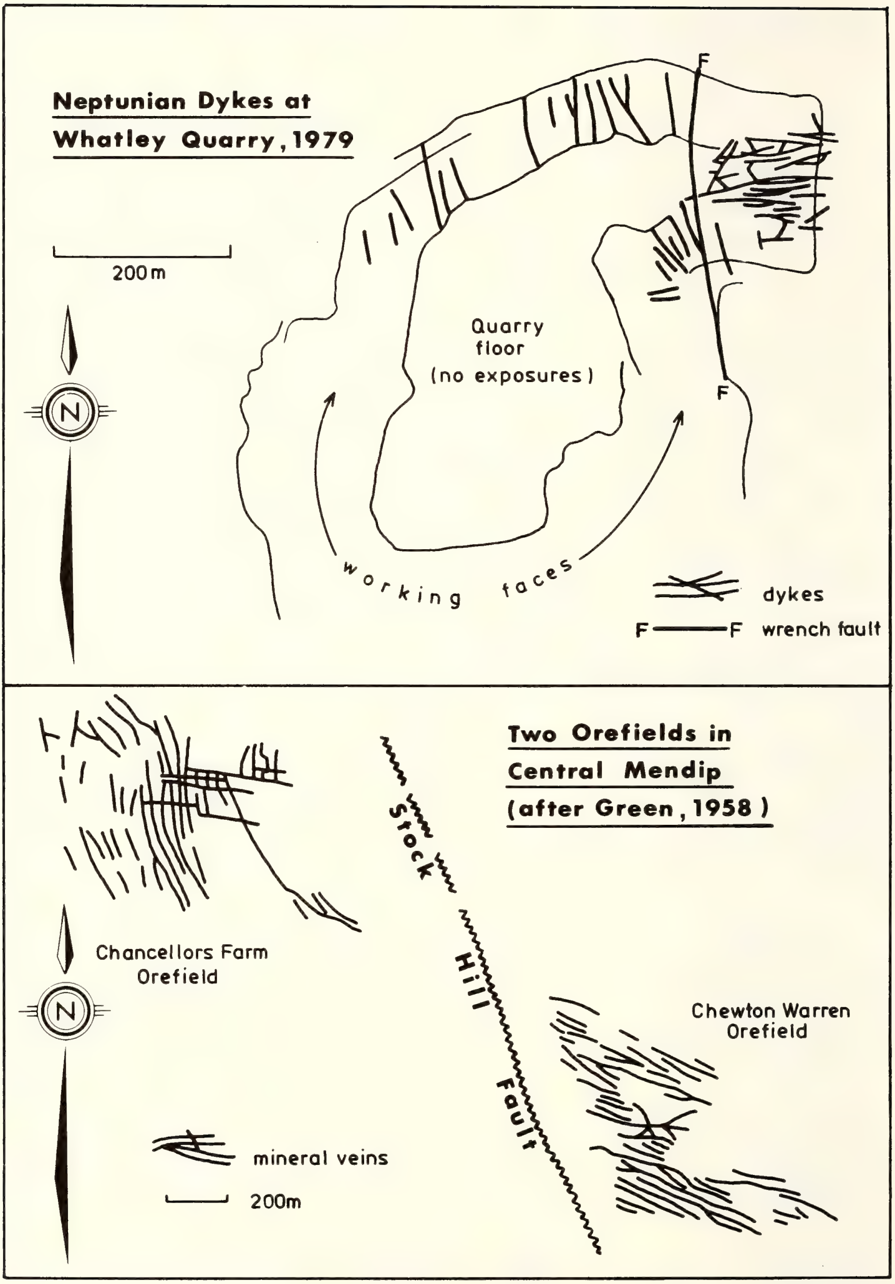
Neptunian Dykes at Whatley Quarry, 1979
200m
N
F
Quarry floor (no exposures)
F
working faces
dykes
F—F wrench fault
Two Orefields in Central Mendip (after Green, 1958)
Stock Hill Fault
Chancellors Farm Orefield
N
Chewton Warren Orefield
mineral veins
200m

Figure 3. Similar patterns: a localised neptunian dyke swarm in East Mendip and localised groups of mineral veins in Central Mendip.

migrated under the cover of Keuper marl and Jurassic clay to form hot submarine springs at points where the clay cover was punctured. Some of their mineral load was deposited as fissure-fillings and replacement masses close beneath the thinnest cap rocks, where the fluids were most affected by reduced pressures and lowered temperatures.

Hot mineral springs are a feature of rift valleys today. In the global tectonic framework (Mitchell and Garson 1981) the Central Somerset rift valley could be classified as a post-collision rift or part of a failed intracontinental rift. The latter appear to be commonly associated with carbonate hosted stratabound Pb-Zn mineralization.

ACKNOWLEDGEMENTS

The author is grateful to Sage and Down Ltd. and Amey Roadstone Corporation, for allowing access to Lulsgate Quarry and Whatley Quarry respectively, and to Wessex Water Authority for permitting reference to data obtained in their hydrogeological study of the Eastern Mendips.

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Book review: *The Oxford Book of Insects.*
Oxford University Press, pp 201 + index.
Main text by John Burton with illustrations by Joyce Bee, Derek Whiteley and Peter Parks. The original hardback has now been reduced to a pocket edition 15 x 11 cm. Price £2.50.

The book consists of a combination of pages of text facing coloured illustrations. The print is about the same size as data labels pinned under museum insects and will mostly benefit the sharp-eyed younger reader. There are short notes on classification down to orders, structure, metamorphosis and protective devices.

Whereas birds receive disproportionate attention in Natural History Societies, there is still a need for more insect 'twitchers'. This book can be used in the field as the basis for a number of thematic approaches and some hints are given below. This is Butterfly Year and there is opportunity to contribute to a survey of numbers and species in the West Country. Sadly, the Large Blue was declared officially extinct following a bad season in 1979. For those interested in dragonflies a key to identification of all British adults with notes on biology, conservation and national status is available (at 75p) from the Worcestershire Nature Conservation Trust, The Lodge, Beacon Lane, Rednal, Birmingham, B45 9XN. Bumble bee enthusiasts will find an atlas published by the Institute of Terrestrial Ecology most useful; it costs £1.78 (including postage) from 68 Hills Road, Cambridge, CB2 1LA.

A greater challenge is offered by some lesser known species. The Bristol region is rich in limestone rocks and snails are therefore plentiful. This provides a good opportunity to sample the surprisingly small number of insects which eat snails, perhaps by staking them out as bait.

Fleas may be collected from birds nests and from animals. One unusual approach to insect study is to learn to recognise common plants and find the species associated with them. Examples illustrated in this book include some moths (Foxglove Pug, Mallow, Cinnabar, Bulrush Wainscot, Wormwood Shark, Mullein), some beetles (Water plantain weevil, nut weevil, figwort weevil) and some bugs (bracken, reedmace, pinecone, hawthorn and sloe). Representatives of several orders of insects may be hatched out from plant galls, and from leaf mines, while various flies are involved in the pollenation of wild arum flowers inside which they can be found trapped overnight.

The strength of this book lies in its breadth of coverage of all the major British insect orders. I look forward to the appearance of a pocket edition of the Oxford Book of Invertebrates.

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AVON BIRD REPORT 1981

Compiled by a Committee of
BNS Ornithological Section
and Bristol Ornithological Club

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INTRODUCTION

EDITORS

H.E. Rose has succeeded Mrs J. Humphris on the Committee. We congratulate K.E. Vinicombe on his election to the British Birds Rarities Committee. We thank G. Sweet for specialist advice.

COMMON BIRDS

Many common species are reported not at all or to such a limited extent that summarizing the information each year would be both repetitive and misleading. We are trying to map breeding season distribution on a 1km square basis over several years and would welcome observations identified to 1km grid squares, in particular with evidence of breeding. The BTO Winter Atlas, for which R.L. Bland is the county organiser, should permit the mapping of commoner species on a tetrad (ie 2km x 2km square) basis.

A bald list of first and last dates of summer migrants has only limited use, so our account of the year gives the first and last two or three dates, to give some idea of whether or not the extreme dates refer to 'stragglers'. Wintering Blackcaps increase, and of 130-odd reports received 100 referred to wintering birds. But more data, from Bland's co-operative winter study of garden birds. will not be available until the end of the winter, so we defer further analysis until next year.

PROBLEM BIRDS

For this report we have considered in detail 133 records of local rarities or problem species. In some cases this would have been easier, and correspondence would have been avoided, if fuller details had been given. For example, some records of Scaup lacked adequate descriptions, especially of bill tip colour. Hybrids can be confusing, so this is important, and we cannot publish records received without details. Willow Tits have a limited distribution locally, and we request descriptions here too.

Often sea terns are reported as 'Common/Arctic'. We feel that with modern field guides and optical aids, it should be possible to separate the species more often than is currently done. We recognise of course that in some circumstances separation is not possible.

THE YEAR

1981 had the mildest January for five years, the second wettest March for 250 and the coldest December on record.

Throughout January high pressure over the Azores brought warm Atlantic air, on west to north-west winds, to most of the country. The first three weeks were changeable and windy but the last ten days were mild and dry, particularly in the south; early Swallows, Yellow Wagtails and Wheatears reached Cornwall late in the month.

The generally mild but changeable and occasionally cold weather continued into February and many Bewick's Swans left the Wildfowl Trust early. From about the 10th high pressure over western Europe brought cold continental air. Snow or sleet fell locally on five days, but did not lie. One Glaucous Gull and several Mediterranean Gulls reached Avon; others were scattered across the country from the north to Cornwall. A White-headed Duck, thought on close study to be a hybrid, arrived at CVL in late February from Blithfield, Staffordshire. It was particularly interesting that at the time both the Blitfield and CVL Ruddy Duck flocks (totalling over 1,100 birds) were dispersing. March was very unsettled, dull and wet - surpassed in rainfall only by 1947; at Long Ashton the rainfall was three times normal. Winds were mostly from the west or south-west and often fresh or strong. France had similar conditions and no migrants appeared until a few days of more settled weather there. The first noted locally were a Sand Martin on the 10th and four on the 12th. Single Wheatears were seen on the 14th and 15th at six places from Sand Bay to Aust. The first Swallow reported was on the 20th at Hinton Charterhouse, followed by four at Aust on the 23rd and two at CVL on the 26th. The first Willow Warbler was at CVL on the 22nd; another was there on the 26th, and ones and twos at several places on the 28th. They were widely distributed within a few days. On the 27th a fall of 130 Goldcrests was noted at Sand Point. The first House Martins reported were one at CVL on the 28th, one on the Clevedon coast next day, two at Littleton on Severn on April 5th and one at St. George, Bristol on the 11th. On March 22nd and April 8th, coastal movements of Meadow Pipit flocks up the Severn Estuary were observed.

The last three days of March and the first half of April were largely fine and sunny, though with cool easterly winds and some rain. A few mild, warm days with southerly winds from April 8th brought more migrants: Whinchats at Keynsham on the 9th and Filton on the 14th; Sedge Warblers at CVL on the 11th, 14th and 16th; Garden Warblers at Milton Hill on the 12th and at CVL on the 25th (then no more until May 9) and Lesser Whitethroats at Stockwood on the 14th, Saltford on the 15th and several places from the 17th.

There was a small passage of Little Ringed Plovers, with up to four at St. George's Wharf on the 12th, at CVL from the 13th, at Cheddar Reservoir from the 14th and on the coast from Berrow, Somerset to Frampton, Glos. from then until the 21st. One pair stayed at Avonmouth Docks and two pairs at St. George's Wharf. There were also two Kentish Plovers at Berrow on the 15th and 16th. From April 22 a northerly airstream brought very cold arctic air over the country, with blizzards in many areas. In Avon, snow and sleet fell on the 25th and 26th. Breeding success of Lapwings on high ground and of ducks at the reservoirs (and doubtless in other places) was markedly affected. Canada Goose breeding at CVL failed entirely. Small birds too must have suffered many losses. The gale force winds brought six Arctic Terns and a Fulmar to CVL, only the third of the latter species to be recorded there; when last seen, on the 29th, it was actively feeding and appeared to be healthy.

On May 2nd a Hen Harrier, and on the 3rd a Marsh Harrier, were noted in South Avon. From May 5th the winds became southerly and brought much warmer, unsettled weather. The rest of the month was often cloudy, with south to south-westerly winds. The first Spotted Flycatchers, last of the summer migrants to arrive, were reported from Rangeworthy on the 4th, Arno's Court, Bristol and Rainbow Wood, Bath on the 8th and Saltford on the 9th. On the latter day a Guillemot, a Manx Shearwater and a Goosander were noted off the Avon shoreline. Next day a Purple Heron, a rare visitor from the south, was seen in the Gordano Valley. In all 21 Sandwich Terns were recorded on spring passage, considerably more than usual; but other sea terns and Black Terns were very few. Late in May, Stonechats were nesting in Bristol at Knowle and Hartcliffe.

After June 3, the weather was unsettled until an anticyclone to the west in mid-month brought cool north-westerly air, giving snow on some Scottish hills: a fitting end to a dull and wet six months. Little Ringed Plovers bred at Severnside and at St. George's Wharf; Ringed Plovers also bred in both areas, and at the latter a pair of Common Sandpipers bred too - the first nesting of this species in Avon. Yellow Wagtails bred within Avonmouth Docks; they seldom breed now on the moors.

For most of July, winds were north-westerly and the weather was mostly dry but rather cool; from the 7th - 10th there was a warm air flow from southern Europe. Many Swifts left early, finding few flying insects in the cool air. Wader species breeding in the far north - Sanderling, Little Stint, Curlew Sandpiper, Bar-tailed Godwit, Spotted Redshank - were from one to three weeks early on autumn migration, indicating poor weather in their breeding areas.

August opened with warm air from the south-east but from the 5th an anticyclone to the west produced north-westerly air for the rest of the month, with mainly dry and settled conditions and some high temperatures. At CVL a juvenile White-winged Black Tern was present on the 13th and the season's only recorded Little Tern on the 15th. On the 19th a Dotterel visited the Kenn Estuary.

Locally September started with a fine, sunny spell, with some showers and thunderstorms in the second week. Winds were mostly north-westerly, though with short periods of easterlies, which were probably responsible for records of a Honey Buzzard over Whitchurch on the 4th, an Osprey at CVL on the 5th and a sizeable flock of Black Terns there on the 7th. On the 18th the continental 'high' declined and vigorous depressions moved eastwards, giving spells of heavy rain and strong westerlies.

An early Red-necked Grebe at Barrow Gurney Reservoirs, two Grey Phalaropes at CVL and a Manx Shearwater off Severn Beach were some results of the winds. The last Spotted Flycatchers were noted on the 9th at Hunstrete, the 12th at CVL and the 20th at Downend, Bristol. Lesser Whitethroats were last reported from CVL on the 12th, Littleton on Severn on the 13th and Saltford on the 27th. The first Fieldfares of the winter were seen in Avon on the 26th, ten days before the first Redwings. Barrow Gurney

Reservoirs had low water levels and produced more wader records than usual; CVL had a high water level all the year, and wader records were few.

The first week of October was dull and often very wet. For the rest it was finer and frequently sunny though cold, with some short periods of easterlies. An uncommon visitor was a Sabine's Gull at St. George's Wharf on the 4th (one was on the R. Parrett, Somerset on the 2nd). The last Wheatears noted were two at Hinton on the 11th, one at the Yeo Estuary on the 18th and one at Chittening on the 24th. the last Swallows were five at Blagdon Blagdon on the 18th, two at Cromhall on the 20th and one at CVL on the 25th. Thirteen at St George Park, Bristol on the 18th must be an exceptional urban record. October gales stranded a Manx Shearwater in Weston-super-Mare and produced two Gannets and a Red-breasted Merganser off Severn Beach, also one of the latter, and several Sandwich Terns, at CVL.

November had largely anticyclonic weather, with north-westerly winds for much of the month. The first Whitefronted Geese and Bewick's Swans were noted in Avon on the 7th and 8th; the earliest arrivals at the New Grounds, Glos, had been on October 16th and November 3rd respectively. The last House Martins were two at New Passage on the 6th and one at Clevedon next day. Among records associated with November gales were those of a Great Northern Diver and a Black-necked Grebe at the reservoirs on the 20th and 22nd, a Little Auk at Severn Beach on the 28th (two more were reported in south Devon the same day), a Red-breasted Merganser off Sand Bay on the 29th and a Great Skua found dead at CVL. Passerine flocks noted in late November and early December included 46 Yellowhammers at Iron Acton and 25 at Latteridge, and 26 Bullfinches in Moorgrove Wood, Henbury, Bristol.

Warm air covered the country in early December, but from the 8th this was replaced by cold arctic air. The temperature rapidly fell below zero everywhere, and depressions brought substantial snowfalls in the south. Temperatures fell below -25 deg. C locally on the clear night of the 12th. A sudden thaw in early evening on the 13th, with heavy rain and a spring tide boosted by westerlies, caused much flooding along the Severn Estuary. At Slimbridge, Glos the Wildfowl Trust lost some seventy tropical wildfowl when their winter quarters were flooded. The cold returned on the 16th and persisted until the last days of the year. It had major effects on bird life, but only a summary follows; more was still to come, and an assessment of the whole winter must await our next Report.

Hen Harriers and Short-eared Owls were more widespread and more numerous than usual, and five Bitterns appeared. On the 12th, in particular, there were extensive movements to the south-west of Lapwings, Stock Doves, Woodpigeons, Fieldfares and Redwings. Redshank became fewer, partly perhaps by movement away, but they are very susceptible to freezing of their feeding areas. Many wildfowl left the freezing reservoirs for the Severn, as did gulls from the CVL roost. Small flocks of duck and Coot moved to small waters and to the moors. There were 165 Mallard on the Avon in Bristol, Coot in the City docks, Canada Geese on the Avon in Bath and a Slavonian Grebe in the Avon Gorge. Whitefronted Geese and Bewick's Swans from the frozen New Grounds were often seen in small parties. Human intervention by feeding birds in gardens became very important. At the end of the year some Lapwings returned. The weather halted reclamation work at Ashton Marsh. Much of this small area just east of Long Ashton, which regularly yielded records of wetland birds, has disappeared in the last decade.

EXOTICS, ESCAPES AND HYBRIDS

Black Swan	One, Portishead, February 10 - March 13.
Bahama Pintail	One, CVL, March 22.
Red-crested Pochard	Male, Victoria Park, Bath, May 21 and November 15.
Red-crested Pochard x Mallard	Female, CVL, April 16 - September 6.
Pochard type hybrid	Male, CVL, June 20 - August 1.
Tufted x Pochard (Lesser Scaup type)	Male, Blagdon Reservoir from November 1980 - March 14, November 15 and December 19. Male, CVL, April 5 - June 17, August 9.
Tufted x Pochard or Tufted x Ring-necked	Female, CVL, August 15.
Scaup type hybrid (Tufted x Pochard?)	Female, CVL, January 17 - March 27, November 28 - December 12. Female, Barrow Gurney Reservoirs, September 28.
Scaup	Two colour-ringed birds, Bristol City Docks, January (from 1980).
White-headed Duck x Ruddy Duck	Male at CVL, February 28 and at Blagdon Reservoir, December 19 - 24 (see THE YEAR above).
Barbary Dove	One, Hinton, January 13.
White Parrot	One, Kingston Seymour, November 25.
Amazon Yellow-necked Parrot	One, Northwick Warth, August 30 - September 5.
Budgerigar	Single birds, Saltford, Failand and Sand Bay, July and August.

SYSTEMATIC LIST

The list below is based on records sent to Bristol Naturalists' Society or Bristol Ornithological Club, plus some from other local or national organisations. Observers are identified only for rare or locally uncommon species, where identification may give problems or in case of unusual dates, places, numbers or behaviour. The species sequence is that of the *List of Recent Holarctic Bird Species (1977)* by K.H. Voous.

CONVENTIONS

NA denotes the part of Avon formerly in Gloucestershire (in essence, the part north of the R. Avon).

SA denotes the remainder (former Somerset Report District 1).

A few place names used frequently are abbreviated:

ASW - Avonmouth Sewage Disposal Works and its surroundings, including Hoar Gout.

CVL - Chew Valley Lake.

SGW - Royal Portbury Dock, the rest of St. George's Wharf

and Portbury Wharf.
Severnside - the coast from Aust to the southern end of Chittening Warth.

The notation [BBRC] means that the preceding record has been accepted by the *British Birds Rarities Committee.*

In the tables, 'nil' means that a regular or systematic search produced no sightings; 'n/c' means that in a series of systematic counts that one was not done; a blank means that in a table built up from many reports there were none for the entry in question. In the wildfowl count tables, an entry in brackets comes from a date one or two days outside the count dates given in the column headings.

ERRATUM

The details for Temminck's Stint in the 1980 Report should read: SA One at CVL, August 30 and 31 (GP, N&LT, KEV *et al.).*

THE LIST

GREAT NORTHERN DIVER

SA First-winter bird at Blagdon Reservoir, November 20 to December 6 (SIB, ILC, JSR *et al.)* and one at CVL, December 6 and 24 (WGB).

DIVER sp.

SA One at CVL, January 6 (HER).

LITTLE GREBE

NA Up to three at Tortworth all year (one on nest in June). Up to three at Littleton Pits, April to September, and at other sites in winter, including one in Avon Gorge on December 18. One at ASW in July.

SA Small numbers noted at 22 widely scattered sites in winter, with largest numbers along R. Avon from Bristol to Bathford. In summer chiefly noted at reservoirs, with c.35 pairs at CVL. Table gives monthly maxima; autumn counts at CVL may be low - counting difficult with high water levels.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Barrow G. Res.	6	5	2	2	nil	3	nil	1	8	3	2	2
Blagdon Res.	2	nil	4	5	n/c	n/c	n/c	8	15	7	nil	nil
CVL	1	2	20	n/c	n/c	70	70	61	56	23	24	5
R. Avon	12	11	2	1	nil	nil	nil	nil	nil	nil	nil	1
Elsewhere (13 sites)	8	11	nil	1	1	1	nil	1	nil	2	3	10

Breeding - at CVL, 25 broods (47+ young) - another good season; some four broods at Blagdon in September; also reports in breeding season of single birds at Newton Park Lake, Wellow Brook and Portbury.

GREAT CRESTED GREBE

NA One report - a single bird at Severn Beach on December 19.

SA Table gives monthly maxima at reservoirs. At CVL, numbers again low in late winter - only one found on February 24; usual large moulting flock in autumn.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Barrow G. Res.	33	15	45	44	n/c	13	9	17	36	36	27	24
Blagdon Res.	3	2	17	20	8	4	10	10	13	12	11	15
CVL	6	12	35	26	45	140	187	450	423	401	137	15

Elsewhere, single birds at Saltford, January 6 - 10, Portishead, May 17 and Buckland's Pool, Backwell, May 31 to June 12 and in late December. Another good breeding season at CVL, where 53 broods (total of 116 young). Only one brood at Blagdon Reservoir (chick five to ten days old on late date of September 27). Single pairs with nests at Hunstrete Lake and Litton Reservoirs.

RED-NECKED GREBE

SA Juvenile at Barrow Gurney Reservoirs on September 22 (TWGL, KEV *et al.)* - an early date. One at CVL, December 28 into 1982 (AM, CN *et al.)*.

SLAVONIAN GREBE

SA One at CVL on November 1 (AM); one on R. Avon near Leigh Woods on December 13 (NTL) - unusual locality for this species.

BLACK-NECKED GREBE

SA One at CVL, November 22 to December 8 (SC, AHD, KJH *et al.)*.

FULMAR — See Introduction

Noted off coast, Severn Beach to Brean Down and off Steep Holm: up to three on ten dates, April 11 to July 18 and single birds on four dates, August to October 11. One dead, Sand Bay, March 14 and another, Weston-super-Mare, November 7. One at CVL after gales, April 26 - 29 (JA, AH, AW *et al.)*.

MANX SHEARWATER

NA Noted off Severn Beach - one, September 20, one, October 2 and two on 9th (BL, RGT, GY).

SA Noted off Brean Down on May 9 (12), July 4 (173) and August 1 (202) (TAB, JH, BR). One found exhausted on steps of Weston-super-Mare Technical College, October 9 (PRJA).

GANNET

NA Two flew N at Severn Beach in gale on October 9 (PJC, RGT).

SA Noted off Brean Down on July 4 (four), 18th (one) and August 1 (41), mostly flying up-channel (TAB, BR).

CORMORANT

Widespread reports of up to six on coast and inland.

NA Present all year at Oldbury Power Station (up to 13, October); 17 flew S past New Passage on October 14. Two fed in R. Avon near Suspension Bridge on December 27 - 29 and also repeatedly tried to land on tall street lamps (JW).

SA At least 42 occupied nests on Steep Holm, June 20 (AJP). Table gives monthly maxima at CVL, where largest numbers occur (though decline here continues).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
26	30	14	6	2	1	4	4	17	21	22	10

SHAG

NA One at New Passage on April 9 (RGT).

BITTERN

Influx in hard December weather. In NA, one flushed from Duchess' Pond, Stoke Park, Bristol, December 15 (BA). In SA, two at CVL - one at Herriot's Bridge from December 17 and one at Hollow Brook from about Christmas, both staying into 1982 (AW, JW *et al.)*; one at Blagdon Reservoir all Christmas week until 29th (BWWCo); one at Portbury Wharf, December 29 (AFS).

GREY HERON

Widespread reports of up to five throughout the year.

NA Maximum counts were eight at Severnside in August and October.

SA Breeding records: c. eight nests at Newton Park, 32 at Cleeve, twenty at Portbury, one in Weston Woods and six at Uphill, where decline ascribed to felling of dead elms and probably disturbance. No data on Clevedon Court (where one nest in 1980).

Largest non-breeding numbers: sixteen at Keynsham, January and February; eight at Clevedon on August 16; fourteen at Bitton and twenty at CVL, both on November 22nd.

PURPLE HERON

SA An adult, Gordano Valley, May 10 (AFS). [BBRC]

Description mentioned its slightly slimmer shape and smaller size than nearby Grey Heron; dark crown; lack of dark eyestripe; purplish neck with long black line running down from head and dark grey back. Latter also noticeable in flight, as was the "dark neck, with bulge hanging below body"

MUTE SWAN

Widely reported throughout lowland area of county.

NA Single pairs nested at Tortworth Lake (brood), Littleton Pits (first here for many years) and St George and Eastville Park Lakes, Bristol (brood at latter). Winter flock in Bristol City Docks reached 30 in January and 37 in December; RSPCA collected several birds after oiling incident in October.

SA Single pairs bred at Portbury Wharf, Bucklands Pool, Backwell (brood of nine), Kenn Moor and Midgell Pits (Chelvey) - male here had been ringed in August 1980 in moult flock, Abbotsbury, Dorset. At the reservoirs, three broods at Blagdon and four at CVL.

Late summer flocks noted on Nailsea Moor (up to 13) and on R. Yeo (eight). Largest numbers at reservoirs, where monthly maxima reflect usual moult gathering:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CVL	8	9	23	23	23	52	67	98	54	14	7	4
Blagdon	nil	2	18	15	16	41	41	40	29	15	1	nil

BEWICK'S SWAN

NA Two at Chittening, January 6. Eight at Northwick, November 8; 5, December 13; 14 on 24th and six on 27th.

SA Twelve at CVL, January 1, eight on 4th, then up to four until 17th; four, February 1 - 3. Eight at Blagdon Reservoir, March 14 - 16, moved to CVL on 18th. Elsewhere, fifteen at Yeo Estuary, January 18 and one at Wrington, February 28. First in autumn: five to S off Weston Bay, October 24. First at reservoirs were five at CVL, November 8; then eight on 29th (when five also seen at Axe Estuary), five on December 3 and five on 16th. Elsewhere, six at Yeo Estuary, December 6 and fourteen on 19th, when nine flew SE over Keynsham; three, Kenn Moor on December 19 - 20 increased to eleven by 24th and fourteen on 27th - 28th; three on nearby Nailsea Moor, December 30.

WHITE-FRONTED GOOSE

First-winter bird noted on Severnside (NA) and SGW (SA) from February 1 to April 7 (probably same individual). Present again from December 4, when nine grazing at Severnside, five in flight there on 13th, 24 on 14th, 17 on 17th, 19 on 27th and one on 28th; 55 in flight at Oldbury on Severn, December 13. in SA: nine over CVL, November 7, six at Axe Estuary and eleven over Weston Bay, December 12; 29 over Portbury on 13th; nine over Saltford on 22nd and 50 - 60 over Gordano Valley on 23rd.

GREYLAG GOOSE

Feral birds recorded as follows: in NA, eight at Tortworth Lake on November 8; in SA, one at CVL on January 4, and small moult flock later - one, June 13, two from 16th, four from July 11 and six, August 1 - 9; five to SW over Barrow Gurney Reservoirs, September 25.

CANADA GOOSE

SA No broods at CVL owing to blizzard on April 25 - 26; monthly maxima there again show a small influx to moult:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
113	76	61	30+	45+	106	117	102	84	75	82	88

Two at Blagdon Reservoir on March 2, then up to six from 14th to May 3. Elsewhere, four on beach at Uphill, April 4; one to S over Brislington, Bristol, May 3; 15 to SSW over Abbots Leigh, June 17. Six again at Blagdon from October 13 to December 6. Freezing conditions later produced nineteen over Chewton Keynsham, December 12 and eight on R Avon at Bath, 19th - 31st.

BARNACLE GOOSE

SA Feral birds noted as follows: one at CVL from 1980 joined by two more, April 20 to May 9, two until June 21 and one until September 28. One at Blagdon Reservoir, March 14 to April 8.

BRENT GOOSE

SA The only record was of a dark-bellied bird, *B. b. bernicla*, at CVL on December 28 (DEB) - the fifth to be recorded there.

SHELDUCK

County total about 360, January to March (sometimes more, due to movements from Glos. and Somerset), and 290 in mid-April; early departure, perhaps caused by late April blizzard; about 130 (40 in NA) remained in mid- May, 70 (+ 75 juveniles) in mid-July, 35 in mid-September and 230 - 240 in late December. Reservoirs: up to four at Blagdon and two at Barrow Gurney, out of breeding season; at CVL, up to eleven, April to June, otherwise up to four; pair bred (five young). Pair bred on Steep Holm (three large young seen).

About 50 young reached coast in NA and 90 in SA; first brood seen, six at Yeo Estuary, May 17; last small young noted, July 20.

WIGEON

County total about 680 in mid-January, falling to 350 by mid-March and 35 in early April. Single birds in April at Northwick (5th), SGW (12th), Clevedon coast (18th); and pair at CVL on 23rd. Female at CVL on June 20, then scattered records of up to thirteen until early October. Largest October count was 51 at Northwick on 24th. County total 345 in mid-November after small influx, jumping to 2,550 after the early December blizzards, with 1,350 on Severnside on 19th and 1,700 on 24th but only 600 from 28th to 31st; from Clevedon to Yeo Estuary total rose from 48 on 13th to 600 on 19th and 350 on 27th.

GADWALL

NA Four at Littleton Pits on January 4 and a female at Eastville Park Lake, Bristol all month. Five off Northwick on November 6. One at Tortworth Park Lake on December 13 and five on 27th.

SA Female flushed from nest (c/11) in bracken at Knowle Hill on June 7 - at least 700 m from CVL (PJC, PGF) - nests usually on edge of water. The only other breeding reports were of a pair with two young at Blagdon Reservoir and six broods at CVL.

Numbers show usual pattern: a few early in year; spring influx to c. 100 (84 at CVL) and autumn flock at CVL, with peak in August of c. 210 (100 fewer than in 1979 or 1980). Fall to c. 80 by middle of October; 60 in mid-November and c. 40 in December. Two in Yeo Estuary on December 19 and two at Bucklands Pool on 20th - 22nd.

TEAL

Up to three (two males) at reservoirs in May and June but no proof yet of breeding in Avon. The table gives mid-month counts for the main areas. Together with small flocks elsewhere these put county total at peak of 1,500 in January with autumn build-up to c. 1,400 in mid-December.

	Jan 17-18	Feb 14-16	Mar 14-15	:	Sep 11-12	Oct 17-18	Nov 14-15	Dec 13-16
Severnside	200	158	16	:	nil	2	128	314
Clevedon	19	15	18	:	nil	35	16	70
Sand Bay	(50)	30	56	:	1	60	40	350
Barrow Gurney	20	19	nil	:	31	50	70	50
Blagdon	630	505	500	:	27	215	135	(240)
Chew Valley	533	324	332	:	301	83	190	358

MALLARD

Table gives mid-monthly counts in main coastal areas and at reservoirs. At CVL, 32 broods (208 young); breeding records from only nineteen other localities.

	Jan 17-18	Feb 14-16	Mar 14-15	:	Aug 14-17	Sep 11-13	Oct 17-18	Nov 14-15	Dec 13-16
Severnside	35	58	6	:	30	36	36	56	34
Bristol*	128	(87)	26	:	n/c	n/c	140	166	165
ASW	(4)	14	19	:	(26)	41	59	36	9
Clevedon	2	30	12	:	16	18	20	15	10
Sand Bay	(200)	67	21	:	(33)	47	100	135	250
Axe Estuary	n/c	(63)	(7)	:	n/c	(163)	250	400	n/c
Barrow Gurney	233	223	48	:	170	282	(183)	(112)	240
Blagdon	300	325	200	:	(155)	170	255	180	(324)
Chew Valley	624	261	237	:	715	676	422	472	604

* R. Avon from Cumberland Basin upstream to Netham Weir.

PINTAIL

NA One on Oldbury Lagoon on January 10; one at Severn Beach on October 18; five at Northwick on 24th, fourteen there on November 6 and a pair off Aust Warth on December 29.

SA Of 74 records, only four in double figures: eleven at CVL on March 23 and 10 - 12 there in second half of December. On coast: one in Weston Bay on March 15; three at Yeo Estuary on same day and eight there on December 19.

GARGANEY

SA A male at CVL, April 17 and a pair on May 14; a male from June 8 to August 9 (two females also, on June 18), two on August 12, 28th and September 6; no evidence of breeding. A male at Blagdon Reservoir on July 25 and a female there on September 12.

SHOVELER

NA Regular at ASW, January to March with monthly maxima of 36, 60 and 47 (numbers varied daily); three on April 15 and two on May 22; present again from August 3, with peak of 49 on October 20. At Oldbury Lagoon, a pair in February and early March, five on September 20, then up to thirteen. Five records from Severnside (maximum eight, November 6).

SA Numbers extremely erratic. Table gives monthly reservoir maxima, but no data received for Barrow Gurney and Blagdon on dates when CVL total was highest, in September and December.

	Jan	Feb	Mar	:	Aug	Sep	Oct	Nov	Dec
Barrow Gurney	8	4	5	:	42	147	61	65	10
Blagdon	28	20	20	:	10	20	58	36	30
Chew Valley	195	140	70	:	265	430	78	185	500

Occasional at Bucklands Pool, Backwell (maximum five, October) and at SGW (maximum eleven, April 17). No breeding records.

POCHARD

NA Again regular at ASW from January to April (up to 14) and from late August onwards (up to 27). Up to five at Tortworth Lake and on coast; unusual summer record of male off Severnside, June 30. In Bristol, up to five in City Docks early in year, one from November 4 and four from December 24; two on St George Park Lake in March.

SA Up to 160 roosted At Bucklands Pool, Backwell in January, but left at dawn, probably for Barrow Gurney reservoirs, where up to 260 present during day. Mid-month reservoir counts:

	Jan 17-18	Feb 14-15	Mar 14	:	Oct 13	Nov 12-14	Dec 14-15
Barrow Gurney	229	117	35	:	7	32	131
Blagdon	71	76	22	:	6	13	(72)
Chew Valley	89	59	49	:	47	118	113

Sailing at Cheddar reservoir (Som.) moved 400 - 500 birds to Blagdon on occasions in January, November and December.

Five broods (32 young) at CVL, where moult flock built up to 148 (138 males) in June, 170 in July and 205 in August. December dispersal brought small flocks to Yeo Estuary and SGW (10 and 35 on 19th), Nailsea Moor (2 on 22nd) and R. Avon at Pill (13 on 28th).

TUFTED DUCK

NA Occasional (up to nine) at eight widespread sites, including St George and Eastville Park Lakes, Bristol. At Tortworth, up to 36 to end of April and 20 in October, but no more than six later.

SA Only five broods (21 young) at CVL. Table gives mid-month counts at reservoirs. Note Blagdon moult flock (mainly males) in September; other moult counts were of 550 there on August 30 and 510 at CVL on August 15.

	Jan 17-18	Feb 14-15	Mar 14	:	Sep 11-14	Oct 13	Nov 12-14	Dec 14-15
Barrow Gurney	80	135	57	:	80	46	50	101
Blagdon	64	176	135	:	770	350	375	(275)
Chew Valley	129	128	317	:	107	54	161	200

SCAUP

NA A female or immature bird, ASW, October 3 - 11.

SA A female at Barrow Gurney reservoirs on January 18 and three (two males) at CVL from April 13 - 30.

Note: several records received lacked sufficient detail, in particular of bill tip, for acceptance.

EIDER

NA Four females and imm. male off Severnside, December 22 - 31.

SA Immature male on Clevedon coast, January 9. Up to five, Weston Bay in March, three in April, six in August and four in October.

LONG-TAILED DUCK

NA Single bird flying N off Northwick on November 1.

SA Immature male at Blagdon Reservoir on January 4 (disturbed by sailing from Cheddar Reservoir, Som.); also one, perhaps same bird, April 8, and at CVL, March 16, 21st and often, April 15 to May 16.

COMMON SCOTER

NA Thirteen off Northwick on May 4, and six on 7th. One off Severn Beach June 6 - 9 and two on 10th; two there, October 27 - 30 and one December 17 - 18. Three males off Aust, October 6.

SA Male at CVL on February 28, April 16 - 18 and two, June 13. Four in Weston Bay, March 31 and eleven off Sand Point, April 12. Passage in mid-July: seventeen (16 males) at CVL on 12th and seven (5 males) on 21st; eleven (8 males) at Barrow Gurney on 18th and five off Middle Hope on 24th. In autumn, male at CVL, August 6 - 8; male in Weston Bay on August 1 and four on October 15.

GOLDENEYE

NA Female on R. Severn at Northwick on November 6 - 7. Immature male on Eastville Park Lake, Bristol, December 1 - 7.

SA Two at SGW all February. Reservoir peak of 71 in March. An immature male summered at CVL; second bird there, September 3, then small increase in late October; total under 30 in November and c. 35 in December. Also in December at Bucklands Pool (one on 12th), Saltford (one on 23rd), Yeo Estuary (six) and Weston Bay (one) on 24th, and Nailsea Moor (one on 29th).

SMEW

SA Records only from reservoirs: single 'brownheads' at Barrow Gurney, Blagdon and CVL, January to April 5 - probably involving only two birds. Male at CVL, March 16. 'Brownhead' at CVL, December 1 - 28 and probably same one at Blagdon on 19th and 24th.

RED-BREASTED MERGANSER

NA 'Brownhead' off Severn Beach on October 19.

SA 'Brownhead' at CVL from October 31 into 1982. Male in flight, Sand Bay, November 29.

GOOSANDER

NA Female flying up-river off New Passage, May 9.

SA One in flight, Axe Estuary, October 3.

Reservoirs: one or two at Blagdon early in year and thirteen on December 15; single 'brownheads' at Barrow Gurney, February 6 to March 22 and December 14 - 24. Widely variable counts at CVL - eg. 26 to 41 on January 24 - possibly (cf. 1980) due to flights to and from R. Avon, Saltford to Keynsham, where up to nine, January to March and late December, and up to thirteen in April. Ten flew over Keynsham towards CVL, December 19. Flights also seen to and from CVL in direction of Litton Reservoirs, but only record from latter was of two in January. Two injured females summered at CVL, where winter monthly maxima were as follows:

Jan	Feb	Mar	Apr	:	Oct	Nov	Dec
41	41	54	3	:	3	43	57

RUDDY DUCK

NA Two males on R. Severn off New Passage, November 6.

SA County total about 500 in late January and mid-February and still c. 380 on March 10 but only 52 by 31st. Six broods (sixteen young) at CVL; twelve females there in July and August. More from late September - 264 in area on November 15; 330 at Blagdon on December 19 (no CVL data) and c. 380 at CVL, December 31. One or two at Barrow Gurney Reservoirs in September and October, and up to six in late December.

HONEY BUZZARD

SA One flew SW past Battery Point, Portishead, May 17 (TBS). One flew W over Hursley Hill, Whitchurch, September 4 (DW).

MARSH HARRIER

SA Female or immature bird, CVL, May 3 (JA, AHD, TS).

HEN HARRIER

SA 'Ringtail' harrier, probably this species, Sand Point, May 2 (TBS). Influx into county from mid-December: ringtail at Kenn Moor on 17th (AFS) then a male at SGW on 19th (GJU) which flew off to W; male, perhaps same, at Woodspring Priory, same day (MAS, TBS), and male at CVL on 24th (KEV). Single ringtail in NA, Chittening Warth to Severn Beach on 24th and 27th (BL, RGT) and one, sometimes two, at SGW from 26th to 30th (JRB, DE, AFS) - probably two birds in all. Ringtail over Abbots Leigh on 28th (AFS, TBS) and one on Nailsea Moor on 28th and 29th (JGM).

GOSHAWK

One flew E over Bucklands Pool, Backwell, November 1, mobbed by two Crows (EVS).

SPARROWHAWK

Evidence of breeding: in NA from Bathford, Kelston and in central Bristol and Shirehampton (but not from other Bristol sites used in 1979 and 1980); and in SA from Leigh Woods, Abbots Leigh, Saltford, Chewton Keynsham, Stantonbury Hill, Wilmington, CVL (two sites, though reports indicated three territories held), Cameley, Chewton Wood and Wellow area (two sites). Noted in breeding season in a further 101 one-km squares.

Widespread reports during rest of year; many accounts of attacks, mostly by males and always in late afternoon, on Pied Wagtails and Starlings at roost or pre-roost gatherings in Bristol at Cumberland Basin, Broadmead, Temple Meads Station and Nelson St. during January to March, November and December.

BUZZARD

Evidence of breeding: in NA from Cromhall and North Stoke; and in SA from Portbury, Walton-in-Gordano, Cadbury Camp, Wraxall, Tyntesfield (two pairs) and Chewton Wood. Breeding season records from a further 50 one-km squares. Maximum count: seven together over Weston-in-Gordano and Failand Ridges, March and June. Very pale individuals noted at Wraxall and at Stantonbury Hill.

Birds seen over Bristol: Fishponds area, January 25, October 13 and October 22, all moving S to SW; and over Stoke Bishop, April 17, Moving NE.

OSPREY

SA One at CVL, September 5 (HOC).

KESTREL

Evidence of breeding: in NA from Oldbury Power Station, Aust, Avonmouth Docks, Shirehampton and Avon Gorge; and in SA from SGW, Portbury, Tickenham, Ashton Park, Nailsea Moor, Queen Charlton, Stantonbury Hill, Newton Park, Hunstrete, Stanton Prior, Knowle Hill (Chew Stoke), CVL and Wellow. Breeding-season records from a further 153 one-km squares.

Widely reported throughout the year, including, as usual, many sightings alongside motorways.

MERLIN

NA Male between Pilning and Tockington, January 12 (GY). Female seen frequently on Severnside, January to April 16; two females together at Northwick, January 20. Immature male on Severnside, August 23, then female from September 10 to year-end, observed taking Dunlin, Skylark and Greenfinch; pair at Northwick, October 31 to November 3 (BL, NTL,RGT *et al.).*

SA Single female/immature birds at Sand Bay on January 12 (HER), at SGW on September 15 and several dates in October and November (GJU), Axe Estuary on October 17 (RA) and in Yeo Estuary - Sand Bay area on several dates, October 18 to December 13 (RA, KJH *et al.).*

HOBBY

Occupied site in NA and another in SA, but breeding not proved. Spring migrants at Chittening Warth on May 7 and Cowslip Green nr Wrington on 13th. As in recent years, majority of other records came from CVL and Blagdon Reservoir from June to early September. Two were hunting together over the latter on August 20. Other records from Newton St Loe, September 10 and Henbury, Bristol on 19th.

PEREGRINE FALCON

NA Single birds on Severnside, March 20 - 22, April 28 and May 4, and again on many dates from September 15 to year-end (many observers). On October 24 an immature bird at Northwick was mobbed by female Merlin, both departing for Gwent shore.

SA Single birds seen near Yatton on January 18 (MSK) and CVL on February 7 (DE); on coast at Uphill on June 13 (RA); at SGW on September 27 and an immature bird wearing jesses there on November 7 was seen also in NA in Chittening area on 27th (PJH). Female at Sand Point on November 3 (HER).

RED-LEGGED PARTRIDGE

NA Reported from eight areas, four of them near Cromhall - Leyhill (probably released birds). Largest covey: eleven at Oldfield Gate nr Dyrham Park, November 25.

SA Noted February to September: at twelve sites - six in ST66, one in ST75, four in ST76; and one bird at Sand Point in April.

GREY PARTRIDGE

NA Breeding season records from ST77 (Tormarton, Hinton Hill and Marshfield), ST68 (Rudgeway and Rangeworthy) and ST58 (Easter Compton and Chittening Warth). Winter coveys of five at Tog Hill and seven at Doynton in January, and ten at Marshfield in November.

SA Breeding season records from fourteen areas, twelve of which were in ST36, ST66 and ST75. Breeding proved at Saltford and near Newton St Loe. Winter coveys at Queen Charlton (14 birds, January) and at Corston Fields (17 birds, December).

WATER RAIL

One at Severn Beach, December 4 - the only record from NA. In SA, single birds noted from January to April 2 on R. Avon near Kelston, at Portbury Wharf and CVL. Reported again from August 19 onwards; one or two at Blagdon Reservoir, CVL, Nailsea Moor and Kenn Estuary up to end of October, then notable increase: ten or more at CVL, November 7 and 8 and up to eight on 22nd; three at Sand Bay and two on Weston Moor on 14th; one at Abbots Leigh on 1st. In December, up to five at CVL and single birds at Abbots Leigh, Nailsea and Tickenham Moors and Sand Bay; also one found dead in a garden at Congresbury.

MOORHEN

Only twelve breeding records from whole county. Largest concentrations noted were 32 on R. Boyd at Hinton on June 13; 30 at Blagdon on September 13 and 30 at Eastville Park Lake, December.

COOT

Breeding reported in NA only at Tortworth (1 nest) and ASW (2 nests). In SA bred at Blagdon Reservoir (27 broods), CVL (60 broods), Newton Park (1 nest) and Bucklands Pool, Backwell (2 broods). Monthly peak counts at Tortworth Lake and reservoirs show August moult gathering at CVL but then major flock at Blagdon:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tort.	41	26	50	23	n/c	n/c	n/c	n/c	50	n/c	74	54
B.G.	n/c	29	n/c	n/c	n/c	n/c	36	65	139	84	37	n/c
Blagdon	265	45	440	280	190	116	265	565	950	680	800	930
CVL	319	540	630	515	407	455	730	1560	845	160	194	320

After the early December blizzards, numbers at Bucklands Pool increased from four or five to eighteen by 17th and 31 by year-end; one appeared in Bristol City Docks and five on R. Avon at Saltford.

OYSTERCATCHER

NA On Severnside, occasional single birds in January and March, then up to three until May 21; up to six in every month from July 2 onwards, but ten on August 15. Six to W near A46, Old Sodbury, December 26.

SA Present on coast from SGW to R. Banwell all year, but double figures (max. 12) on only four dates. In Sand Bay and Axe Estuary, up to 90 from January to March; up to 45, April to August; up to 120, September to November and up to fifty in December. Inland: three at CVL in March and August, and seven on July 21.

LITTLE RINGED PLOVER

NA One, Aust Warth, April 16. Pair bred within Avonmouth Docks but eggs destroyed by rubble-tipping (MTD) - see next species.

SA At SGW, two pairs present from April 12; one pair raised seven young in two broods (MTD, CN, AW). Other records, all of single birds: CVL: April 13 - 19, July 15, September 3 - 10; Clevedon to R. Yeo: April 14, July 7 and September 13; Saltford S.F.: August 2; Barrow Gurney Reservoirs: August 8 and juvenile, 22nd - 23rd; Sand Bay: juvenile, August 31.

RINGED PLOVER

Table gives monthly maxima in main areas: in NA at Oldbury Power Station and Severn Beach to Chittening; and in SA, Clevedon to R. Banwell, Sand Bay, Axe Estuary and CVL.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	35	50	8	12	31	nil	1	287	170	57	30	5
SB-C	40	31	19	100	153	10	50	388	126	46	22	35
C-RB	nil	nil	nil	2	12	3	6	45	16	2	4	20
S. Bay	20	22	5	2	20	nil	4	450	430	n/c	22	35
Axe	60	30	n/c	n/c	n/c	n/c	n/c	30	38	n/c	31	16
CVL	1	1	nil	nil	1	nil	1	1	12	2	nil	nil

Other counts of nine or more: 50 at SGW on February 8, and up to twelve at Barrow Gurney Reservoirs in August. Bred in NA at Chittening (one young seen - PJC) and Avonmouth Docks (MTD) where eggs destroyed by rubble-tipping; and in SA at SGW, where two pairs raised twelve young (MTD).

DOTTEREL

SA One at Kenn Estuary on August 19 (HER).

GOLDEN PLOVER

NA Severnside: up to 76 in February, single birds in August, up to nine in September, one on October 10/11 and 25 on December 12. Inland: 71 at Hinton Hill, September 13; 100 at Little Sodbury on October 7 and 150 at Hawkesbury Common on December 28.

SA Noted from January 1 to April 19 and from July 12 to year-end. Records of 100 or more from Burnett (300, January; 150, November); Nailsea and Kenn Moors (100 in January); Saltford (160, October); Axe Estuary (138, November) and Clevedon to R. Yeo (320, December). At CVL, up to 70 in January, up to 26 in September, three in late November and up to 50 in December.

GREY PLOVER

NA Single birds noted occasionally at Oldbury Power Station up to April. Present at Severnside from August 7 onwards: twelve up to November 1 and maximum of four thereafter.

SA Noted occasionally on coast until June 7 and from August 18, with up to 30, Clevedon to R. Yeo, and up to ten in Sand Bay.

LAPWING

Breeding proved or probable in 74 one-km squares (20 in NA, mostly along the Cotswolds, and 54 in SA, mostly between coast and M5 motorway). The table gives counts for areas with maxima over 400: Northwick, Rangeworthy and Hinton in NA; and Clevedon to R, Banwell, Axe Estuary and CVL in SA. Blanks indicate that no data were received:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nor.	650	450	122	nil	4	180	1500	2000	1000	300	600	800
Ran.	600											800
Hin.		600							1250	730		
C-RB	175	135	100	27	30	600	375	2500	450	90	200	2500
Axe	700	600							300	1000	1000	
CVL	1200	540				48	200	400	650	200	600	600

Hard weather movements to S and SW noted from December 12 - 18; 1500/hour passed Axe Estuary on 12th. A reverse movement to N and E took place in milder weather of late December.

KNOT

NA Three at Oldbury on Severn, July 19. On Severnside, recorded from April 1 onwards; generally up to eight birds, but eleven on July 30 and 51 on September 13.

SA Largest numbers at SGW in September (maximum of 37 on 19th). Elsewhere on coast only ones and twos, except for five in September and seven in December at Sand Bay. One inland record: one at Barrow Gurney Reservoirs; October 5 - 11.

SANDERLING

Spring passage April 9 to June 10: up to six at Severn Beach, up to ten at Sand Bay and one or two elsewhere on coast. Autumn passage July 12 to October 3: up to four at Oldbury Power Station and Severn Beach, nine in Woodspring Bay and up to three elsewhere on coast. Winter record: one at Sand Bay on December 16.

LITTLE STINT

No spring records. Autumn passage, July 24 to October 11: on coast largest numbers at Oldbury Power Station - fourteen, September 13 - 20 and eight on 27th; up to four elsewhere. At Barrow Gurney Reservoirs one on August 19, up to ten in September and one on October 3 and 11th; at CVL up to five from September 5 to October 11.

CURLEW SANDPIPER

No spring records. Autumn passage August 16 - October 18. On coast, six at Oldbury Power Station, September 20 and six at Clevedon on 13th; four at Axe Estuary on August 29; otherwise fourteen records of up to three. Inland: eight in flight over Barrow Gurney Reservoirs, September 3.

PURPLE SANDPIPER

NA Recorded at Severn Beach up to May 9 (up to five in January, seven in February, eight in March and April and five in May) and from November onwards (three). One at Littleton on Severn, November 21.

SA Sand Point: two, April 1 and two on 16th.

DUNLIN

Table gives monthly maxima in the main areas: Oldbury Power Station, Severn Beach to Chittening, Clevedon to R. Banwell, Sand Bay, Axe Estuary and CVL.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	1100	1000	950	2	31	7	105	194	280	97	1300	1000
SB-C	1660	3000	2000	1200	1200	22	300	350	290	200	1000	4350
C-RB	900	2100	1600	137	650	15	500	20	18	450	1400	2400

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SBay	4000	2000	3000	5	600	nil	250	700	470	n/c	2000	4000
Axe	1500	1200	200	n/c	n/c	n/c	n/c	90	n/c	n/c	2000	2000
CVL	85	150	110	2	6	nil	2	3	4	10	10	3

Counts over 100 also from SGW (200 - 250 in January, February and October) and Portishead (250 on December 5).

RUFF

Two in flight, Littleton on Severn, July 8; then 13 records from coast and Sea Mills, August 9 to October 18 (maximum, three at ASW, September 15). Reservoirs: at CVL, up to six on many dates up to March 8, up to three from August 8 to September 12,up to eighteen to 21st and up to six to October 2; one or two at Barrow Gurney, August 12 to September 6; one at Blagdon on August 2 and two on September 10.

JACK SNIPE

Noted on and near coast, Oldbury Power Station to R. Banwell, January to April 5 (22 records) and from September 16 (19 records); maxima of three at SGW and Portishead, seven from Clevedon to R. Banwell and six at Sand Bay. Inland records, all in SA, of one or two occasionally up to April 18 at Ashton Marsh (but seven, January 29 and nine, April9), Portbury, Bucklands Pool (Backwell), Kenn Moor, CVL and Batheaston; occasional single birds from October 11 at Saltford S.F., Stockwood refuse tip, Bucklands Pool and CVL.

SNIPE

Noted on coast up to April 14 and from July 19 onwards. Table gives monthly maxima for areas where maximum reached twenty: in NA, Oldbury on Severn to Littleton Pits, Aust to Chittening and ASW; and in SA, Clevedon to R. Banwell, Sand Bay, Axe Estuary, the Gordano Valley, Nailsea and Kenn Moors, Saltford Sewage Farm, Blagdon Reservoir and CVL.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
O-L											20	
A-C										22		22
ASW	8	8	25								6	
C-RB	32	15	22	5			1	8	4	10	23	26
SBay	14	8	7								11	20
Axe									5	16	28	
G.V.		12					1			30		
N&K	32		6	2							12	18
SSF	31		1	1				1			7	10
CVL	2	22	18				2	30	20	15	12	n/c
Bl	17	10	40							2	52	12

Inland records from Yate (two in flight, April 20); Stoke Bishop, Bristol (one in flight, November 1); Rangeworthy (three, November 8) and Itchington (one, December 12). Drumming heard in SA at Ashton Marsh and Gordano Valley.

WOODCOCK

Records covered January to March 5 and November 22 onwards. Single sightings in NA at Cromhall, Upper Wetmoor, Over, Blaise Woods, Henbury, Hallen and Chittening; and in SA at Redhill and at Barrow Gurney, Blagdon and Chew Valley Reservoirs. At Abbots Leigh up to three throughout periods named.

BLACK-TAILED GODWIT

In spring noted only on SA coast, in ones and twos, April 5 - 19. In autumn, noted on coast and at reservoirs from July 12 (one, Oldbury Power Station) to September 26 (two, CVL), mostly in ones and twos, but four, July 19, and at Severnside seven from August 8 - 31 and up to six in September.

BAR-TAILED GODWIT

Small spring passage: 26, Oldbury Power Station, April 20; one, Clevedon - R. Banwell, on 26th and up to fourteen on three May dates to 17th. Autumn passage July 12 (two, Woodspring Bay) to September 19 (nine, SGW) with maxima of twelve on Severnside, seventeen on Clevedon coast and two at CVL. Winter records of single birds at Sand Bay in January and November and Axe Estuary in December.

WHIMBREL

Two-thirds of all records were of fewer than four birds. Spring passage April 9 - May 12. Counts of ten or more - eleven in flight, Saltford, April 15; Clevedon coast: 44 on April 18, 40 on 26th and 25 on May 3; Sand Bay: 21 on April 19, 12 on 25th; Nailsea and Kenn Moors: 45 on May 5 and fourteen on 10th. Autumn passage July 12 - September 3. Counts of ten or more: 60, SGW, September 8; Clevedon coast: ten, July 16; present to 31st with 35 on 23rd, then nineteen on August 16; fifteen, Nailsea Moor on July 26.

CURLEW

The table gives the maximum monthly counts in the main areas: Severn Beach to Chittening, R. Avon, (Sea Mills), SGW, Clevedon - R. Banwell, Sand Bay, Axe Estuary and CVL.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SB-C	92	108	84	16	6	55	138	144	154	160	156	150
Avon	10	12	1	nil	nil	nil	nil	nil	nil	10	28	26
SGW		60	250					130	190			20
C-RB	160	80	85	45	12	24	70	70	190	65	90	90
SBay	230	145	137	75	12	22	120	200	170	150	200	25
Axe	350	300							100	180	120	200
CVL			3	3	1	1		4				

SPOTTED REDSHANK

Two records in NA: one in summer plumage at Chittening, August 2 and one at Northwick, September 6. In SA, one at Clevedon on April 12 - the only spring record; one or two noted on coast on six dates, August 9 to September 19; also six at Sand Bay on August 31 and seven at Woodspring Bay on September 3. At CVL, one or two throughout August (five on the 21st), up to five in September (but nine on 16th and seven on 17th) and up to three to October 11.

REDSHANK

Twelve pairs raised young at SGW. Probably bred at Portbury and in five one-km squares on coast south of Clevedon. The table lists monthly maxima in the main areas: Oldbury Power Station and otherwise as for Curlew:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	29	30	90	4	nil	9	31	150	90	nil	80	15
SB-C	173	21	183	nil	nil	25	280	320	104	150	210	300
Avon	65	120	40	nil	nil	22	1	17	48	80	100	80
CR-B	120	60	75	134	40	100	120	150	135	155	140	70

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S Bay	110	106	20	12	2	nil	100	100	200	n/c	160	90
Axe E	70	110	24	2	nil	nil	12	nil	6	120	120	80
CVL	nil	1	nil	1	1	1	2	3	1	2	nil	nil

GREENSHANK

One winter record: a single bird at SGW on January 1. Spring records: one at Clevedon on April 26 and two on May 10. Autumn passage July 3 - October 25. In NA, ones and twos on coast and up to three at ASW; in SA up to 24, Clevedon to R. Banwell, July 31 to August 31 (24 on 30th); otherwise up to six on coast. Inland, single birds on two August dates each in Gordano Valley and at Bucklands Pool, Backwell. At the reservoirs, most at Barrow Gurney - one, July 24, up to thirteen throughout August and up to eight to September 23; at Blagdon, single birds on July 17, August 30 and September 12; at CVL, three on July 3, up to four throughout August, up to three in September and one or two to October 15.

GREEN SANDPIPER

Coastal records up to April 19 and from July 12 onwards. Reservoir records up to March 28 and from July 11.

NA Noted on coast and at ASW: single birds on seven dates to April 19, and up to five birds from July 4 to October 31.

SA Table gives monthly maxima at SGW, Nailsea Moor and reservoirs:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SGW	5	3	3	3					4	2		1
N.M.	3	1	1	1					2	2	3	3
B.G.								2	1	4	2	nil
Bl.	1	1						4				
CVL	1	2	3				6	15	7	2	1	2

Single birds also in February, April and August at Portbury, Ashton Marsh and Keynsham to Saltford.

WOOD SANDPIPER

Another poor year - one record, of a juvenile bird present at CVL from August 29 to September 1 (CJS, KEV).

COMMON SANDPIPER

Pair raised four young at SGW - first breeding record for Avon. Winter: single birds on R. Avon, Bristol up to March 5 and from November 27; at Clevedon up to March 15 and at CVL from 1980 up to April 5 and on November 1; two in Axe Estuary, February 21. Spring passage April 5 - May 16, with up to two at Chittening, three at ASW, six in R. Avon, Bristol, four at SGW, one or two at Barrow Gurney and Blagdon Reservoirs and at CVL up to fifteen in April and five in May. Autumn passage June 25 - October 18, with maxima of two at Littleton Pits, eight on Severnside, fourteen on R. Avon at Shirehampton, five at ASW and Saltford and sixteen on Clevedon coast. Two at Bucklands Pool, Backwell, August 8 and one at Steep Holm on 17th. Reservoir maxima in July, August, September and October - Barrow Gurney: 6, 11, 9, 3; Blagdon: nil, 4, 4, nil; CVL: 24, 20, 14 and 2.

TURNSTONE

Occurs mainly from Severn Beach to Chittening and at Clevedon; monthly maxima as follows:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SB-C	150	131	162	175	180	5	40	160	150	150	138	96
Clev.	24	17	21	32	1	5	12	22	22	25	22	26

Elsewhere, 35 at Redcliffe Bay on February 15 and eleven on March 17, and twenty at Portishead on December 5: otherwise four or fewer. Inland record of one at Barrow Gurney Reservoirs, July 28.

GREY PHALAROPE

SA A juvenile/first winter bird at CVL on September 20 and another on 26th KEV). Two juvenile/first winter birds on October 10 - 11; one found dead on 16th (RMC, HER, CJS *et al.)*.

ARCTIC SKUA

Only two reports, both from area of Severn Beach: two (dark phase) on April 9 and four (light phase) on May 4.

GREAT SKUA

One found dead at CVL on November 28 (CJS, KEV) - third record (fourth individual) at the lake.

MEDITERRANEAN GULL

Records (all of adults) as follows. At CVL, singles birds on January 17, February 17, 23rd and 28th (AH, PJK, AW), usually with Common Gulls; one at Blagdon Reservoir on March 2 (JSR) - first record here; one over M4/ M5 Interchange at Almondsbury, NA, February 21 (MLP, SNGH); two at CVL, November 29 (AM, CJS, KEV).

LITTLE GULL

Fewer records than usual. The only spring reports were of one at Portishead on April 5, three at New Passage on 10th and an adult at CVL on May 3. In autumn, up to three juveniles at CVL on many dates from August 6 - 23, then one or two, September 6 - 9; a first winter bird at Axe Estuary on October 31 and another at CVL on late date of December 16 (AW).

SABINE'S GULL

A Juvenile seen briefly at SGW on October 4 (MTD, JHo) - the 17th record for Avon.

BLACK-HEADED GULL

No counts received for the major roosts. Table gives monthly maxima for sites counted regularly: Severn Beach to Chittening, ASW, R.Avon (Sea Mills area), Bucklands Pool (Backwell), Barrow Gurney Reservoirs, Clevedon to R. Yeo and Sand Bay.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SB-C	1000	475	670	170	46	550	3500	2500	650	2000	1300	6000
ASW	850	800	350	36	28	150	n/c	350	2500	84	n/c	n/c
Avon	500	400	800	63	5	10	300	820	1500	620	400	1600
Buck.	360	100	82	n/c	n/c	n/c	12	50	30	280	510	650
B.G.	330	615	400	n/c	n/c	n/c	300	180	340	1040	1500	400
Cl-Y.	400	560	500	30	25	180	1000	1500	1200	400	300	8500
S.Bay	200	300	200	10	2	300	900	1300	300	n/c	100	200

Reports of feeding flocks numbering 500 or more came from Redhill (800, February), Blagdon Reservoir (2,500 in February, 1,000 in March and 1,200 in November), Dodington (600 in March), Cribbs Causeway, Bristol (700 in March)

Little Sodbury (500 in August), CVL (3,000 in August), Axe Estuary (2,500 in August) and Midford (700 in November). A bird with very pale plumage was noted at CVL on February 1.

RING-BILLED GULL

SA A first-winter bird at CVL on March 30, 1980 (TPA, RAB, SAB) was the second to be recorded in Avon; the first, an adult, had occurred there eight days previously - see 1980 Report. [BBRC]

COMMON GULL

Widely recorded but no roost counts were received and few reports were of over 100 birds. Larger flocks - over 200 - in NA were: 450 at Marshfield in February and 850 in November; 500 at Dodington in March; 600 near Badminton in July; 500 at Little Sodbury in August; 325 near Horton in October; 275 on Freezing Hill near Wick in November; large flock (1,250) feeding in Kelston Park on December 6 flew N into or across grid square ST77, in which over 1,000 had been feeding in February and November; 250 on Sodbury Common on December 30. The only large counts from SA were during the December cold spell: 300 off Yeo Estuary on 19th - an unusually large number here - and 250 at Stockwood on 24th. A leucistic first-winter bird was seen at CVL on November 29.

LESSER BLACK-BACKED GULL

No roost counts received. Records from about 20 sites only, containing no detailed breeding data, but in early June at least 500 on Steep Holm and 40 in centre of Bristol. Fair numbers occurred regularly on R. Avon (Sea Mills area) and at Barrow Gurney reservoirs, where monthly maxima were:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avon	8	14	8	37	10	45	3	8	10	24	15	21
B.G.	46	78	84	n/c	n/c	n/c	51	70	68	15	100	49

Other records over 50 from Blagdon Reservoir (110 on February 8), Lulsgate (63 On April 7), Oldfield Gate (64 on August 30), Ashton Vale (75 on September 6 and 93 on November 26) and Priston (100 on November 1).

HERRING GULL

No roost counts and very few other records received. No counts from main breeding colonies on Steep Holm and in centre of Bristol, except reports of 1,000+ on the island and 100+ in the city in June. Over 400 noted in a field S of Blagdon Reservoir on April 17 and 175 on R. Avon at Sea Mills, June 17. Counts of up to 60 from nine places including ASW, reservoirs and coast. Yellow-legged adults, probably of the race *L. a. michahellis,* noted at CVL: two on August 12, one on November 22, 29th and December 5 (CJS, KEV); and Weston-super-Mare beach: one, November 22 (RA).

GLAUCOUS GULL

SA First-winter bird at Portishead, February 25 (JRB).

GREAT BLACK-BACKED GULL

Up to three in most months at Oldbury on Severn, Severnside, Clevedon to R. Yeo and CVL; occasional reports from R. Avon, Barrow Gurney and Blagdon reservoirs and Sand Bay. A few pairs bred on Steep Holm, where at least fifteen noted, including four pulli. Larger counts included six at CVL on April 30; and at the Yeo Estuary, six on August 8 and five on October 4 and 11th.

KITTIWAKE

First-winter bird at Portishead on January 7 and one on R. Avon (Horseshoe Bend) on December 9 - midwinter records unusual. Spring passage: 178 moving up-river off Aust and one at Barrow Gurney Reservoirs on March 17; five coastal records of one or two later in March, one on April 15 and three on May 4. During NE gales in last week of April, c. 50 (mostly adults) at CVL on 26th then two on 28th and three on 29th.

SANDWICH TERN

Spring passage: one, New Passage, May 4 and seventeen there on May 14. Three passed SE of Steep Holm on 9th. Autumn passage July 9 - October 11; two, Clevedon to Yeo Estuary, July 9 and one, August 16; three at CVL, October 10 and up to three at Barrow Gurney Reservoirs on 10th and 11th.

COMMON TERN and ARCTIC TERN See Introduction

Very small spring passage: one at CVL, April 5 and six more reservoir records to June 27 - maximum six (Arctic) at CVL, April 26; coastal records from New Passage and Severn Beach, April 17 to May 16 (maximum 16 on May 9); one on R. Avon at Saltford, May 11. Most of those specifically identified were Common Terns. Autumn passage July 11 - October 11. Four individuals on coast; all other records from reservoirs were of twelve or fewer except at CVL (where 20 on August 10 and 17th and 25 on 24th). During autumn, 73 Common and eight Arctic were specifically identified, including a juvenile Arctic on August 16, another on September 20 - 21 and two more, October 9 - 11, all at CVL.

LITTLE TERN

SA One at CVL on August 15 (CJS) - the only record.

BLACK TERN

Spring passage: the only records were of four at New Passage on May 7 and four and six at CVL on 9th and 10th respectively. Autumn passage July 30 - October 11; two at Axe Estuary on October 4, otherwise noted only at reservoirs - one, Barrow Gurney, July 30, then fifteen or fewer at CVL except for influx of 115 on September 7 (only three present next day) and 25 on 12th.

WHITE-WINGED BLACK TERN

SA Juvenile at CVL, August 13 (TRC, JBOR *et al.)*. [BBRC]. A bird present at CVL from September 12 - 19 resembled a juvenile Black Tern, but showed the pale rump and wings of the present species and was perhaps a hybrid (AHD *et al.)*. See *British Birds, Vol. 73, 223-5* for a similar record - Eds.

GUILLEMOT

Single birds noted at Sand Bay, February 13 and (dead) on 22nd; off New Passage on May 9; off Sand Point on October 31 and (dead) in Weston Bay, November 7. Three off Steep Holm, June 6.

RAZORBILL

SA One found dead at Weston-super-Mare, October 24 (RA).

LITTLE AUK

NA One flying NE off Severn Beach in gale on November 28 (RGT).

STOCK DOVE

Reported from widely scattered areas throughout year. Breeding season records from 28 one-km squares in NA and eight in SA. Largest flocks reported were at Chittening where 400 reported on December 16 (GY) but only 200 - 250 from 17th to end of year. Total of 300 flying south in three hours at Axe Estuary on December 12.

WOODPIGEON

Common. Largest flocks noted were in NA - 520 at Iron Acton on November 29 and 400 at Rangeworthy on December 6. Strong movement to SW on December 12 - 500 passed Axe Estuary in three hours (see Stock Dove) and c. 340 over Moorgrove Wood, Henbury (NA) on 13th.

COLLARED DOVE

Noted in all months but only really large concentration was again at Avonmouth Docks (NA), where 200 throughout January. Breeding season reports from 66 one-km squares, of which 50 in NA.

TURTLE DOVE

Reported between April 15 and September 13 from five sites in NA and ten in SA, with May - July (possibly breeding) records from four and six respectively.

CUCKOO

Reported between April 11 and September 1 from twenty areas in NA and 31 in SA.

BARN OWL

Regularly reported from twenty localities (only three in NA) with breeding at three sites.

LITTLE OWL

Reported throughout the year from 28 NA and 52 SA localities, though breeding confirmed at only two sites in NA and four in SA.

TAWNY OWL

Reported in all months from ten localities in NA and 30 in SA, with breeding at three in NA and three in SA.

SHORT-EARED OWL

NA One or two at Chittening, January until April 20 and during November and December. A pellet found on March 8 (NTL) contained a ring from a Dunlin ringed at Sand Bay in its first year, on October 16, 1977.

SA One, Clevedon coast, May 13. From October onwards up to three were reported at Stockwood Refuse Tip, SGW, Nailsea Moor (where five on December 28 and four on 29th), the Kenn and Axe Estuaries and Sand Point.

SWIFT

First records: single birds over Ashton Hill (Failand) on April 17 and at CVL on 29th, with main arrival on May 7, when first noted (all in substantial numbers) at twelve widespread localities. Very large numbers feeding at CVL in early June - c. 15,000 on 2nd (DB) and 10,000 on 4th (PJC, PGF); about 10,000 again on July 25 but only 100 on August 9 and one on 12th (KEV). Last seen, August 28.

WRYNECK

NA One at Westbury-on-Trym (NA) on September 5 (JT).

SA A juvenile bird was ringed at CVL on September 7 (DJE) and one was seen at Congresbury, 14th - 18th (RHR).

GREEN WOODPECKER

Widespread resident; 28 reports from NA and 49 from SA.

GREAT SPOTTED WOODPECKER

Widespread resident; 27 reports from NA and 41 from SA.

LESSER SPOTTED WOODPECKER

Reported in all months from six NA and nine SA localities.

SKYLARK

Between 1979 and 1981, evidence of breeding was found in 440 one-km squares (PJC *et al.)*.

SAND MARTIN

Records (91) from March 10 to October 7. Breeding reported only at Keynsham Log Mills.

TREE PIPIT

Reports of up to four on migration, March 29 (one, Walton Moor - MK) to May 31 and August 25 to September 3. Successful breeding noted in SA at Charlton Field nr Whitchurch and at Burrington Ham.

RED-THROATED PIPIT

SA One at CVL, October 4, 1979 (AM, N & LT). [BBRC] Second record for county (first was at Blagdon Reservoir, September 24, 1973).

ROCK PIPIT and WATER PIPIT

Reports (40) of up to six birds at coast and reservoirs, January 18 to April 5 and July 7 to year-end.

Water Pipits (all apparently of the race *A. s. petrosus*) noted from January 24 to April 5 (two, Ashton Marsh and four, CVL) and October 18 to November 7 (two, Blagdon Reservoir and four, CVL).

YELLOW WAGTAIL

Reports (22), April 4 - 27, of migrating birds, mainly at coast and reservoirs; usually one or two, but eighteen at CVL on 26th.

Reports (48), May 3 - September 21, of up to three birds, mostly at reservoirs and R. Avon; but MTD noted 35 at Avonmouth in mid-May and found five nests with eggs - the only breeding record received. One seen at Clevedon on April 18 (WE) and one at the Yeo Estuary on June 14 (HER) resembled the Blue-headed race *Motacilla f. flava*.

PIED WAGTAIL and WHITE WAGTAIL

Winter roosts: in NA, at Oldbury Power Station (up to 5,000 in January and February - JH); in reed-bed at Stapleton (116); and in Bristol at Cumberland Basin (200) and Broadmead; and in SA at Claverton, Bath (300). At CVL, c. 100 roosted, August to October.

White Wagtails noted at Severnside and reservoirs, April 16 to May 9 and June 20 (one at Portishead - TBS) to September 17; maximum of eight at CVL, April 28.

WAXWING

SA Three at Keynsham, November 28 - 29 (per JWD).

DIPPER

Up to three in NA at Wick and at Snuff Mills, Fishponds, Bristol; and in SA at Rickford, Highbury Hill, Hallatrow, Withy Mills*, Tuckingmill, Keynsham, Dunkerton, Combe Hay, Midford*, Monkton Combe and Freshford. (* Nests found).

NIGHTINGALE

Singing males, April 14 to June 3, at Tortworth (1), Inglestone Common (12) and Elberton (2), NA; and in SA at Easton-in-Gordano (1), Combe Hay to Midford (3) and near Wellow (4).

BLACK REDSTART

Up to three from January 2 to April 21 at Knowle (Bristol), Avonmouth (two males in January, pair in February), Portishead, Clevedon and Weston-super-Mare. Up to three again from November 14 onwards, at Chittening, Henbury, Hotwells and Brislington, Bristol; and at SGW, Portishead, Clevedon, Blagdon Reservoir and CVL.

REDSTART

Reports (22), April 9 to May 2 and July 10 to September 16, of up to four on passage, in NA at Thornbury, Rangeworthy, Filton and Sea Mills (Bristol); and in SA at Stockwood (Bristol), Nailsea, Langford, Worlebury Hill, Sand Point, CVL, Blackrock near Publow and Saltford.

WHINCHAT

Reports of up to eight, April 9 to May 30 and July 16 to October 18, in NA from Aust, Northwick, Severn Beach, ASW, Sea Mills, Filton and Marshfield; and in SA from Keynsham, Saltford, Stockwood (Bristol), SGW, Nailsea Moor, Clevedon, Sand Bay and Blagdon and Chew Valley Reservoirs. No reports of breeding.

WHEATEAR

Reports (140), mainly from coast, of up to twenty on passage, March 14 to May 24 and July 9 to October 24.

RING OUZEL

Recorded on passage as follows: in NA, two at Rockhampton April 9; in SA, two at Uphill, April 11; single birds at Walton Moor, March 29, Portbury Wharf on April 10, Sand Point on 19th and Yeo Estuary on October 18.

FIELDFARE

Reports (45) of up to 550, January to April 21; in autumn, two at Northwick, September 26; then 98 reports of up to 1,300 to year-end; but 1,500 per hour to SW for three hours at Axe Estuary, December 12 (RA) and 2,000 at Kingston Seymour on 24th (TBS).

REDWING

Reports (64) of up to 1,000 from January to April 8; in autumn, two, Abbots Leigh, October 6; then 83 reports of up to 1,100 to end of year. Extensive movements to SW, involving many thousands, noted in several areas on November 22 and December 12.

GRASSHOPPER WARBLER

Migrating birds noted at fourteen scattered localities, April 8 to May

9. Singing males, May 17 to end of July, at Queen Charlton, Stockwood (Bristol), Stanton Prior, Burrington Ham and Yeo Estuary.

REED WARBLER

Breeding recorded in NA at Littleton Pits (57 ringed, including 26 adults) and Chittening Warth, and in SA at Portbury, Nailsea Moor, Kenn Estuary and CVL (where many pairs bred; 27 nests found).

WHITETHROAT

Noted in breeding season in 70 one-km squares (PJC) with successful breeding recorded in NA at Pucklechurch and Hinton Hill, and in SA at Ashton Park, Lulsgate, Burrington Ham, Chew Stoke and Charlton Field nr Whitchurch.

WOOD WARBLER

Singing males recorded between April 18 and June 14, in NA at Hill and Penpole Woods (Bristol); and in SA at Leigh Woods, Abbots Leigh, Nailsea, Brockley Combe, Worlebury Hill and Rainbow Wood (Bath).

PIED FLYCATCHER

Single birds on passage were noted, April 12 - 26, in NA at Aust and Filton; and in SA at Arno's Vale (Bristol), Nailsea, Sand Point and Weston Woods. One at Odd Down, Bath on September 7.

BEARDED TIT

NA One ringed at Littleton Pits, April 5 (JH, JR).

SA Up to six, CVL, January 24 to March 5 (JA, CN, KEV *et al.*).

WILLOW TIT

Records submitted with confirmatory details: one, sometimes two, in NA at Littleton Pits, Inglestone Common, Horton Bushes and Oakford; and in SA at Claverton, Saltford and Burrington Combe.

RAVEN

NA One at Cromhall on January 11 and two on September 13 (JH); one at Hill, April 18 (RJP).

STARLING

In Bristol, large roosts continue under Cattle Market Road Railway Bridge and in Temple Meads Station; roost developed from October onwards in Corn St.; 20,000 roosting at Avonmouth Docks in January.

CHAFFINCH

Largest winter flocks: 400 at Marshfield, February 11 and 300 at Keynsham on 28th; 400 at Latteridge on December 6 and 500 at Chittening on 28th with c. 100 Bramblings. Large movement noted in many places, October 17; 8,000 passed New Passage in five hours.

BRAMBLING

Reported from numerous NA and SA localities in flocks of up to 100, January 5 to May 16 and up to 50, October 14 onwards, but c. 100 at Chittening on December 28 (see previous species).

SISKIN

Reports (100), January 1 to April 20, of up to 60 birds in many localities; also 120 near Woolard in January and several counts of 100 or more along R. Avon from Saltford to Keynsham - AHD counted 180 - 200 on this stretch on February 14 (largest flock, 70). About 100 reports from October 4 onwards; several flocks of 70 to 80 birds, also c. 100 at CVL in November and more along R. Avon - 128 at Saltford on October 25 and c. 260 on December 2 (JWD). One, Walton Moor, June 21 (TBS).

TWITE

Noted from January 1 to February 26 and from October 31 onwards but somewhat fewer than in recent years: 10 - 13 at Portishead in January and February, and one at Severn Beach on February 11. In autumn single birds at Severn Beach and Chittening, four at SGW, eleven at Portishead and up to eight from Clevedon to Yeo Estuary.

REDPOLL

Flocks of up to 25, January to April 23 and of up to nine from September 4 onwards, in widespread NA and SA areas (86 reports). Two at Portishead on May 10 and one on 26th, and two pairs at Burrington Ham on June 1 but no evidence of breeding.

HAWFINCH

SA One or two recorded at Leigh Woods on March 20 and (carrying nest material) on April 1, and at Cadbury Camp on May 28 and July 28 (HSW, JW, JMW).

LAPLAND BUNTING

NA One at Chittening Warth, November 15 (BL) and a first-winter bird at Severn Beach, December 18 (GY).

SNOW BUNTING

NA Several individuals on Severnside, September 28 - December 17.

SA One at Yeo Estuary on February 5. Four at Kenn Estuary on November 22.

CORN BUNTING

NA Up to ten singing males reported from the Tormarton area, Hinton Hill, Marshfield and Lansdown. The largest winter flock noted was of 110 at Marshfield on February 11 (PJC).

SA One singing male reported from Corston. One winter record - a single bird at Sand Bay on December 25 (AFS).

OTHER RESIDENT OR COMMONLY-OCCURRING SPECIES PRESENT:

(Those marked * are referred to in the Foreword.)

Pheasant, Kingfisher, Swallow*, House Martin*, Meadow Pipit*, Grey Wagtail, Wren, Dunnock, Robin, Stonechat*, Blackbird, Song Thrush, Mistle Thrush, Sedge Warbler*, Lesser Whitethroat*, Garden Warbler*, Blackcap*, Chiffchaff, Willow Warbler*, Goldcrest*, Spotted Flycatcher*; Long-tailed, Marsh, Coal, Blue and Great Tits, Nuthatch, Tree-creeper, Jay*, Magpie, Jackdaw, Rook, Carrion Crow, House Sparrow, Tree Sparrow, Greenfinch, Goldfinch, Linnet, Bullfinch*, Yellowhammer* and Reed Bunting.

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P.J. Dolton
M.T. Dorgan
J.W. Duckworth
A.G. Duff
E.W. Duval
W. Earp
S.B. Edwards
D. Embling
T.G. Evans
P.G. Farmer
W.H. Fegan
G.J. Fewings
N.W. Gardener
J.J. Garigan
M.G. Goodfield
C. & V. Graham
B. Gray
B.J. Gregory
P.A. Gregory
K.J. Hall
H.R. Hammacott
N. Hankins
Mrs H.L. Hartnell
A. Hawkins
A.J. & J. Holmes
J. Holt (JHo)
P.J. Hopkin
K. Howard
R.T. Howell
S.N.G. Howell
J. Humphris
L.C. Hylton
H. Johnstone
P.B. Keddie
M.S. Kemp
P. Kenchington
D. Kennerley
B.L. Kington
P.J. Knight
Mrs Knight
N.T. Lacey
D.E. Ladhams
B. Lancastle
G. Lancastle
H.R.H. Lance
J. Lay
T.W.G. Lewis
D. Lightstone
A.R. Lindsay
A. & M. Lord
J.G. Martin
N. Marvin
J.A. McGreal
T. McLellan
A. Merritt
A. Middleton
J.G. Milton
W.W. Moss
Mrs F. Neal
C. Newman
R. Palmer
A.J. Parsons
D.H. & L. Payne
E.S. Pike
R.H. Poulding
M.L. Powell
J.G. & S.E. Prince
R.J. Prytherch
B. Rabbitts
A.P. Radford
S. Randolph
G.W. Rayner
T. Riddle
P. Robinson
R.H. Robinson
P. Rock
Mrs A. Rodway
H.E. Rose
J.B.O. Rossetti
J.S. Rowe
J. Ryman
M Shepherd
A.F. Silcocks
T.B. Silcocks
Mrs M.A. Silcocks
B.E. Slade
T. Smith
E.V. Southam
D.E. Stainer
R.N. Staples
E.P. Stephens
C.J. Stone
J.P. Taylor
M.V. & S.M. Taylor
R.G. Thomas
E.M. Tigwell
N. Tooth
N. & L. Tucker
J. Tully
G.J. Upton
J.D.R. Vernon
K.E. Vinicombe
J. Waldon
H.S. Walker
D. Warden
J.M. Warne
A. Whatley
R.J. White
S.J. White
C. Williams
N.J. Willmott
M.G. Wilson
S. Woods
M.A. Wright
G. & S. Youdale

Bath Natural History Society
Dursley Bird-watching & Preservation Club
Herefordshire Ornithological Club

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AVON & DISTRICT ENTOMOLOGICAL REPORT 1981

Compiled by the recorders of the Entomological Section

R.S. Cropper
K.W. Miller
A.R. Nichols
K.H. Poole
R.H. Poulding
R.W. Rowe
G.W. Sorrell
A.H. Weeks

The recorders almost without exception agree that the weather in 1981, particularly the cold spring, had a disastrous effect on the subsequent level of populations of many species. Although the numbers of insects may have been generally low, the volume of records received has been maintained and included an exceptional variety of local and rare species. For a number of years the Section has sent data to the National Biological Record Centre at Monks Wood, Cambridgeshire for the various recording schemes covering the Lepidoptera, Coleoptera and Orthoptera. The initiation of the Bristol Regional Environmental Record Centre at the City of Bristol Museum and Art Gallery for the collection and processing of biological data from vice-counties 6 and 34 is an exciting new development. Discussions with the BRERC for the permanent storage on computer of the wealth of insect records held by the recorders are in progress and it is feasible that much of the data will be computer stored in the future together with results of current field surveys.

Since 1977, with computer storage of records in mind, the Section has encouraged the standardization of the method of recording insects with the issue of a recording card which requests basic information on date, numbers and locality with grid reference. The card is now widely used by most observers for their annual returns of records but errors concerning site designation are causing problems. Unfortunately, sites and localities are often incompletely defined without a supporting grid reference - giving the name of a wood, pond or hill as the locality is insufficient. Although the observer, and perhaps the recorder, is familiar with a particular wood in Avon, an operator processing the record for permanent computer storage may have great difficulty in locating it without the name of the nearest village or town and grid reference. Many small sites have only local names which may not on Ordnance Survey maps. To enable our records to be made available for both card and computer storage it is essential that sites and localities are clearly specified and allocated a full 100 metre grid reference. As many sites occur repeatedly in this annual report the recorders are considering defining these sites with an acceptable locality and grid reference. These would be listed at the beginning of each report and only the site name used in the text.

The following weather synopsis for 1981 has been compiled from information kindly supplied by A.H. Weeks:-
January was drier and milder than average with February continuing dry but cooler with a heavy fall of snow over high ground on the 25th. Although March was generally mild the month was very wet with little more than half the normal sunshine. It was the second wettest March over the country as a whole since 1727 with only 1947 being wetter. April, although cooler than March, remained dry with near or rather below average temperatures until the 25th-26th when there were blizzard conditions and heavy snowfalls causing

extensive damage to trees, shrubs and spring growth of ground vegetation. Temperatures at the beginning of May were close to average but sunshine was well below. Near mid-month a very wet spell began which continued into the first half of June and generally the month was cool with night frosts recorded in the county on 26th-27th. July continued wit below average sunshine but temperatures were nearer normal with variable rainfall. In August nearly all the rain fell on 6th-7th with the rest of the month fine and warm which continued into the first week of September. Then a wet spell started which continued through October which was a cool month with the first frosts occurring in mid-month. November was dry and dull with above average temperatures, whereas December was cold from the start. Snow fell intermittently from the 8th with the heaviest falls on the 11th and 13th. Severe gales combined with spring tides caused extensive damage and flooding along the coast on the 14th. The year as a whole was a wet one with sunshine totals well down but with temperatures not far from normal.

Records refer to Avon unless G or S appears after the locality denoting Gloucestershire or Somersetshire respectively, and are of single specimens unless noted otherwise. The following sent in records from which this report was compiled:-

R. Angles, R. Barnett, H.K.Barton, C.S.H. Blathwayt, J.F. Burton, P.J. Chadwick, R.S. Cropper, E.W. Gane, B.S. Harper, Mrs M. Knight,K.W. Miller, B. Moore, A.R. Nichols, K.H. Poole, R.H. Poulding, F.H. Rawlings, R.W. Rowe, G.W. Sorrell, Mrs M. Taylor, A.H. Weeks.

BUTTERFLIES (Lepidoptera) by G.W. Sorrell and A.H. Weeks

Overall, the weather in 1981 was not favourable to Lepidoptera. A cold spell occurred towards the end of April with quite heavy snow over much of the county, just at the time when the larvae of many species were arousing from hibernation and starting to feed. This disastrous event was followed by a very wet May. It was not until the second half of June that there was an improvement towards normal but did not continue the trend. It was less warm than usual and only August produced real summer weather.

The late cold spell and snow seem to have had their worst effect on the fritillaries, for their were no reports from Avon of the Pearl-bordered, the Small Pearl-bordered, the Dark Green or the High Brown Fritillary, and the first and third of these were recorded at only one location each in the Somerset part of the district. It must be remembered that the weather was bad not only for butterflies but also for observers who were restricted at certain times by the weather conditions. In July and August, species whose larvae are grass feeders, displayed themselves in large numbers especially Meadow Brown, Ringlet, Gatekeeper and Speckled Wood. Of special interest are two unconfirmed reports of the Large Tortoishell at Thornbury and at Hartcliffe, Bristol, and a Clouded Yellow seen on a roadside verge at Lower Langford in August.

The scientific names and order of species follow those given in the checklist by Higgins and Riley (1975).

Pieris brassicae L. (Large White). Common; noted from 17 April to 30 September.

Pieris rapae L. (Small White). Common; noted from 9 April to 16 October.

Pieris napi L. (Green-veined White). Fairly common; noted from 1 May to 1 September.

Anthocaris cardamines L. (Orange Tip). Widespread in fairly small numbers from 15 April to 15 June.

Colias crocea Geoffroy (Clouded Yellow). Single on grass verge of A38 at Lower Langford, 4 August.

Gonepteryx rhamni L. (Brimstone). One disturbed from hedge at Weston-super-Mare, 7 February. Frequent from 9 April to end of August with a few recorded until 31 October.

Limenitis camilla L. (White Admiral). Two, Michael Wood, nr Stone, G, 27 July and one, Westonbirt, G, 2 August.

Inachis io L. (Peacock). Noted from 9 April to 13 September but more frequent in August.

Vanessa atalanta L. (Red Admiral). Noted in small numbers from 6 June to 13 November.

Vanessa cardui L. (Painted Lady). Eighteen, mostly singles, recorded between 3 June and 4 September.

Nymphalis polychloros L. (Large Tortoishell). Two unconfirmed reports provided by BSH: one identified by a resident at Hartcliffe, Bristol, early August and another at Thornbury. Both observers are familiar with this species but the possibility of escapes of reared captive specimens cannot be excluded.

Aglais urticae L. (Small Tortoishell). Common and widespread; first seen, Dyrham Park, nr Dyrham, 24 February while snow still on the ground and last recorded, Horfield, Bristol, 1 December, basking in sun on window-sill.

Polygonia c-album L. Widespread but not common from 26 March to 23 October.

Argynnis paphia L. (Silver-washed Fritillary). Singles at Goblin Combe, nr Cleeve, between 10 July and 25 August; one, Wetmoor, nr Wickwar, 20 July and 20 on 27th; single, Weston Woods, Weston-super-Mare, 29 July - first record at this locality for many years.

Mesoacidalia aglaia L. (Dark Green Fritillary). Recorded at Velvet Bottom, nr Charterhouse, S, 9 August.

Clossiana euphrosyne L.(Pearl-bordered Fritillary). Single record of one, Shapwick Heath, nr Shapwick, S, 31 May.

Euphydryas aurinia Rott. (Marsh Fritillary). Recorded in small numbers at Shapwick Heath, nr Shapwick, S, between 31 May and 28 June; also a few, Charterhouse, Mendip, 23 June and early July.

Melanargia galathea L. (Marbled White). Widespread; recorded in considerable numbers at Goblin Combe, nr Cleeve and Velvet Bottom, nr Charterhouse, S, but in smaller numbers elsewhere from 2 July to 25 August.

Hipparchia semele L. (Grayling). Noted between 10 July and 5 September being most frequent at Goblin Combe, nr Cleeve, Burrington and Uphill.

Maniola jurtina L. (Meadow Brown). Common and widespread from 14 June to 18 September.

Aphantopus hyperantus L. (Ringlet). Common and widespread from 10 July to 16 August.

Pyronia tithonus L. (Gatekeeper). Solitary early sighting on 31 May, then common and widespread from 15 July to 9 September.

Coenonympha pamphilus L. (Small Heath). Noted from 12 June to 12 September. A rather poor year for this species; recorded mainly at Goblin Combe, nr Cleeve; Burrington Combe, nr Burrington; Dolebury Warren, nr Churchill and Velvet Bottom, nr Charterhouse, S.

Pararge aergeria L. (Speckled Wood). Common and widespread from 15 April to 24 September.

Lasiommata megera L. (Wall Brown). Widespread in small numbers from 23 May to 12 September.

Hamearis lucina L. (Duke of Burgundy Fritillary). Several early June, Newton St. Loe, nr Bath, and two, Midger Wood Nature Reserve, Lower Kilcott where ova were abundant, 14 June.

Thecla betulae L. (Brown Hairstreak). Larvae only recorded from Walton Hill, nr Street, S, 31 May.

Quercusia quercus L. (Purple Hairstreak). Michael Wood, nr Stone, G, 27 July and six, Durdham Down, Bristol 29 July.

Callophrys rubi L. (Green Hairstreak). Two, Shute Shelve Hill, nr Axbridge, S, 16 April; two, Shapwick Heath, nr Shapwick, S, 31 May and three, Crook Peak, nr Compton Bishop, S, 21 June.

Lycaena phalaeas L. (Small Copper). Widespread but few in number from 13 Jun to 9 September with maximum of ten, Banner Down, nr Batheaston, 15 August.

Aricia agestis Schiff. (Brown Argus). Widespread from 14 June to 6 September with maxima of nine, Goblin Combe, nr Cleeve and 25 at Crook Peak, nr Compton Bishop, S.

Cupido minimus Fuessly (Small Blue). Recorded at Uphill between 1-20 June with maximum of 59 on 3rd. Several, Midger Wood, Lower Kilcott, 14 June and 30 or more, Dolebury Warren, nr Churchill, 22 June.

Celastrina argiolus L. (Holly Blue). Singles recorded between 17 April and 27 August at various localities including Charfield; Filton, nr Bristol; Durdham Down, Bristol; Leigh Woods, nr Bristol; Yatton; Congresbury and Banner Down, nr Batheaston.

Lysandra coridon Poda (Chalk-hill Blue). Noted at Uphill in small numbers, between 29 July and 12 September with maximum of twenty on 16 August; numerous, Banner Down, nr Batheaston, 15 August.

Polyommatus icarus Rott. (Common Blue). Numerous in south of district from 30 May to 15 September particularly at Dolebury Warren, nr Churchill and Sand Point.

Pyrgus malvae L. (Grizzled Skipper). Six, Goblin Combe, nr Cleeve, 10 May and one, same place, 20 June; four, Crook Peak, nr Compton Bishop, S, 14, 21 June.

Erynnes tages L. (Dingy Skipper). Singles only at Filton, 16 June; Goblin Combe, nr Cleeve, 20 June, Crook Peak, nr Compton Bishop, S, 21 June and Dolebury Warren, nr Churchill, 22 June.

Thymelicus sylvestris Poda (Small Skipper). Recorded in increased numbers from 7 July to 26 August; particularly numerous at Goblin Combe, nr Cleeve; Velvet Bottom, nr Charterhouse, S, and Banner Down, nr Batheaston.

Ochlodes venatus Turati (Large Skipper). A poor year for this species; widespread but only in small numbers from 7 June to 12 August.

MOTHS (Lepidoptera) by K.H. Poole

1981 proved to be yet another disappointment - summed up by one contributor as 'the worst year I can remember for moths!' However, occasionally some fairly good results were obtained at moth-traps and provide the bulk of our records - including a second Blair's Pinion at Knowle, Bristol; Clouded Magpie again at Weston-super-Mare and Blomer's Rivulet, another elm feeder, at Congresbury. Apart from the Silver Y, no migrant moths were recorded. Names are in accordance with Kloet and Hincks, *'A Check List of British Insects'*, 1977.

Deilephila porcellus L. (Small Elephant Hawk). Three, Berrow, S, 19 June (HKB).

Hemaris tityus L. (Narrow-bordered Bee Hawk). Eight larvae on Scabious (Dipsacaceae sp.), Banner Down, nr Batheaston, 5 August (GWS).

Thyatira batis L. (Peach Blossom). Congresbury, 16 July (GWS).

Drepana binaria Hufn. (Oak Hook-tip). University Botanic Garden, Leigh Woods, nr Bristol, (RB) and Congresbury, 3 August (GWS).

Thumatha senex Hb. (Round-winged Muslin). Congresbury, 18 July (GWS).

Eilema complana L. (Scarce Footman). Congresbury, July and August (RWR, GWS).

Acronycta megacephala Schiff (Poplar Grey). Filton, nr Bristol, 1 June (GWS).

Cryphia muralis Forst. (Marbled Green). Congresbury, 30 July and 1, 4, 8 August (GWS).

Agrotis ipsilon Hufn. (Dark Swordgrass). Henleaze, Bristol, 9 September (JFB).

Xestia agathina Dup. (Heath Rustic). Catcott, S, 28 August (HKB).

X. rhomboidea Hb. (Square-spotted Clay). Midger Wood, Lower Kilcott, 24 June (HKB).

Dicestra trifolii Hufn. (Nutmeg). Midger Wood, Lower Kilcott, 24 June (HKB).

Sideridis albicolon Hb. (White Colon). Several, Berrow, S, 6 June (HKB).

Luperina testacea Schiff (Flounced Rustic). Henleaze, Bristol, 9 September (JFB).

Apamea uninanimis Hb. (Small Clouded Brindle). Weston-super-Mare, 13 June (CSHB) and 8 July (KHP); Catcott, S, 28 August (HKB).

A. sublustris Esp. (Reddish Light Arches). Berrow, S, 19 June (HKB).

Ipimorpha retusa L. (Double Kidney). Catcott, S, 28 August (HKB).

Lithophane leautieri Boisd. (Blair's Pinion). Knowle, Bristol, 6 October (HKB).

Cucullia verbasci L. (Mullein). Larva on Common Figwort (*Scrophularia nodosa*), Steep Holm, 25 July (RSC).

Pyrrhia umbra Hufn. (Bordered Sallow). Berrow, S, 19 June (HKB).

Autographa iota L. (Plain Golden Y). Congresbury, 27, 28 July (GWS).

Triphosa dubitata L. (The Tissue). Midger Wood, Lower Kilcott, 30 August (HKB).

Lampropteryx suffumata Schiff (Water Carpet). Chelwood, nr Pensford, 7 May (HKB).

Epirrhoë rivata Hb. (Wood Carpet). Midger Wood, Lower Kilcott, 8 July (HKB).

Anticlea derivata Schiff. (Streamer). Chelwood, nr Pensford, 7 May (HKB).

Perizoma didymata L. (Twin-spot Carpet). Congresbury, 25 July (RWR).

P. bifaciata Haw. (Barred Rivulet). Weston-super-Mare, 23 August (CSHB).

Discoloxia blomeri Curt. (Blomer's Rivulet). Congresbury, 14 July (RWR).

Eupithecia intricata Zett. ssp. *arceuthata* Fr. (Freyer's Pug). Congresbury, 11 June (GWS).

E. expallidata Doubld. (Bleached Pug). Knowle, Bristol, 23, 24 August (HKB).

E. succenturiata L. (Bordered Pug). Congresbury, 15 July (RWR).

E. haworthiata Doubld. (Haworth's Pug). Very common, Midger Wood, Lower

Kilcott, 8 July (HKB).

E. pygmaeata Hb. (Marsh Pug) Shapwick, 31 May; larvae common, 29 June and second brood imagines, early August, same place (HKB).

Horisme vitalbata Schiff (Small Waved Umber). Common, Midger Wood, Lower Kilcott, 30 August (HKB).

H. tersata Schiff (The Fern). Midger Wood, Lower Kilcott, 24 June (HKB).

Abraxas sylvata Scop. (Clouded Magpie). Few, Weston-super-Mare, late June to early July (CSHB).

Cepphis advenaria Hb. (Little Thorn). Weston-super-Mare, 21, 31 May (CSHB).

In addition to the species for Congresbury given above, the following are new to the Congresbury list making a total of 206 recorded since 1975.

Eligmodonta ziczac L. (Pebble Prominent), *Dasychira pudibunda* L. (Pale Tussock), *Lycophotia porphyrea* Schiff. (True Lover's Knot), *Tholera decimalis* Pod. (Feathered Rustic), *Euplexia lucipara* L. (Small Angleshades), *Amphipyra tragopogonis* Cl. (Mouse), *Laspeyria flexula* Schiff (Beautiful Hook-tip), *Lygris testata* L. (Chevron), *Xanthorhoë spadicearia* Schiff (Red Twin-spot Carpet), *Perizoma alchemillata* L. (Small Rivulet), *Eupithecia tripunctaria* H.S. (White-spotted Pug), *Gymnoscelis rudifasciata* Haw. (Double-striped Pug), *Chloroclystis coronata* Hb. (V Pug), *Deuteronomos alniaria* L. (Canary-shouldered Thorn), *Biston betularia* L. (Peppered Moth), *Ectropis bistortata* Goeze (The Engrailed), *Eurrhypara coronata* Hufn., *Notocella uddmanniana* L., *Hedya nubiferana* Haw., *Epiblema trimaculana* Haw., *Clepsis spectrana* Treits., *Pandemis heperana* D. & S., *Olethreutes lucanana* D. & S., *Apapeta zoegana* L., *Endrosis sarcitrella* L.

BEETLES (Coleoptera) by R.W. Rowe

Judging by the lack of interesting reports it was a modest year by any standards, which was almost certainly due to the very variable weather experienced throughout the county. Three species, however, are worthy of special mention. Pride of place must go to the record of one of the larger staphylinids, *Emus hirtus*, taken on nettle growing out of a heap of vegetable rubbish possibly including horse-dung from road sweepings. According to Joy (1932) *E. hirtus* is very rare and is associated with fresh horse-dung. Another interesting report was of *Clytra quadripunctata* taken during the Section's visit to King's Wood, Congresbury. This species is not given by Wilson (1958) in his list of the Coleoptera of Somerset. It is normally found near the nests of Wood Ant *(Formica rufa)* which is well established in King's Wood. The third species of note was *Orsodachne cerasi* which is stated by Wilson to be rarely found in Somerset. The nomenclature following is that given in Kloet and Hincks, *'A Check List of British Insects'*, Vol. XI, Pt. 3, 2nd. Ed., 1977.

Emus hirtus L. On nettles growing in area used for vegetable rubbish, Dodington, nr Chipping Sodbury, 9 May (RHP). Identification confirmed by RWR.

Dorcus parellelolopidus L. (Lesser Stag Beetle). In house, Weston-super-Mare, 7 July (KHP).

Lampyris noctiluca L. Larva in grass, disused railway track, west of Congresbury, 12 July (RWR) and also recorded at Street Heath, Ashcott Corner, nr Street, S, same date (RSC).

Clytra quadripunctata L. Taken from hedge vegetation, King's Wood, Congresbury, 21 June (RWR).

Agabus guttatus Paykull One in puddle, Edford, nr Halcombe, S, 17 July (RSC).

Cassida vibex L. Taken on Greater Knapweed *(Centaurea scabiosa)*, Shapwick Heath, nr Shapwick, S, 12 July (RSC).

Copelatus haemorrhoidalis Fab. One in roadside rhine, Westhay Moor, nr Westhay, S, 5 April (RSC).

Leistus ferrugineus L. Beneath corrugated metal, Chilton Moor, nr Chilton Polden, 12 June (RSC).

Selatosomus incanus Gyllenhal Plentiful amongst grass, Charterhouse, Mendip, S, 7 June (RSC).

Sinodendron cylindricum L. One beneath log, Charterhouse, Mendip, S, 7 June (RSC).

Orsodachne cerasi L. Single specimens found on Hedge Woundwort *(Stachys sylvatica)*, Cheddar Wood, nr Axbridge, S, 17 May; on Hawthorn, Axbridge, S, 23 May and on Twayblade *(Listera ovata)*, Leigh Woods, nr Bristol, 11 June (RSC).

Byturus tomentosus Fab. Two flying in sunshine, Clifton, Bristol, 27 July (JFB).

Cicindela campestris L. Single on ground, Velvet Bottom, Charterhouse, Mendip, S, 10 August (GWS).

Carabus violaceus L. In old tree stump, Weston Woods, Weston-super-Mare, 10 January (GWS).

Necrophorus humator Fab. Flew into garden shed at night, Congresbury, 9 August (GWS).

DAMSELFLIES & DRAGONFLIES (Odonata) by A.R. Nichols

In contrast to last year, rather more records were received for 1981 from an increased panel of observers who reported seventeen species some of which were undoubtedly more widespread and numerous than in recent years. *Coenagrion pulchellum* - the Variable Damselfly- was added to the list of Odonata recorded in the district since 1977, bringing the total to twenty-four. There were a number of sightings of *Aeshna mixta* (Migrant Hawker) reported this year. This interesting dragonfly is uncommon in Avon and is more frequently found in south-eastern counties. The scientific and vernacular names used, and also the order of species, follow those given by Hammond (1977).

Zygoptera (Damselflies)

Coenagrion puella L. (Azure Damselfly). Reported from a number of localities from 6 June to 30 August including one new site at Snuff Mills, Stapleton, Bristol on the R. Frome (MT).

Coenagrion pulchellum van der Linden (Variable Damselfly). Several Chilton Moor, nr Chilton Polden, S, 12 June (RSC).

Enallagma cyathigerum Charpentier (Common Blue Damselfly). First noted at Walton Hill, nr Street, S, 31 May (ARN) and last recorded at Chew Valley Lake, nr Chew Stoke on 5 September (MT).

Pyrrhosoma nymphula Sulzer (Large Red Damselfly). Several Chilton Moor, nr Chilton Polden, S, 24 May and Tadham Moor, nr Wedmore, S, on 25th (RSC); single Priddy Pools, nr Priddy, Mendip, S, 26 July (MT).

Ischnura elegans van der Linden (Blue-tailed Damselfly). This common damselfly was widely reported from 25 May to 6 September. Noted at Snuff Mills, Stapleton, Bristol, July and August (MT).

Lestes sponsa Hansemann (Emerald Damselfly). Several, Clarken Coombe, Ashton Park, nr Bristol, various dates, August; plentiful, Blagdon, 27 August; noted at Chew Valley Lake, nr Chew Stoke, August and September, also at Priddy Pools, nr Priddy, Mendip, 27 August (MT).

Agrion splendens Harris (Banded Demoiselle). Several, Dundas Aqueduct, nr Claverton, 1 July and Snuff Mills, Stapleton, Bristol 19, 30 July and 2 August (MT). Ten, R. Chew at Publow, 1 August (RHP) and a single at Yatton, on 30th (MT).

Agrion virgo L. (Beautiful Demoiselle). Single, Snuff Mills, Stapleton, Bristol 11 June and several, same place, 30 July and 13 August (MT).

Anisoptera (Dragonflies)

Brachytron pratense Muller (Hairy Dragonfly). Female, Chilton Moor, nr Chilton Polden, S, 24 May and a single, Catcott Heath, between Catcott and Catcott Burtle, S, 21 June (RSC).

Aeshna cyanea Muller (Southern Hawker). Recorded from a number of localities between 31 May and 27 September including Inglestone Common, nr Hawkesbury; Henleaze, Bristol; Leigh Woods (Forestry Commision and National Nature Reserve), nr Bristol; Ashton Court, nr Bristol; Snuff Mills, Stapleton, Bristol; Blagdon, Priddy, Mendip, S, and Shapwick Heath, nr Shapwick, S. Noted as plentiful at Priddy Pools, Priddy on 27 August and 3, 5 September (MT), otherwise records were mainly of single specimens.

Aeshna grandis L. (Brown Hawker). Inglestone Common, nr Hawkesbury Upton, 30 July (ARN); Snuff Mills, Stapleton, Bristol, 30 July and 2, 13 and 23 August; Clarken Coombe, Ashton Court, nr Bristol, 10 August and a pair on 12th; Priddy Pools, nr Priddy, Mendip, 11, 27 August and 3 September (MT).

Aeshna juncea L. (Common Hawker). Priddy Pools, Priddy, Mendip, S, 11 August and 3 September and pair on 5th; Blagdon Lake Lake, nr Blagdon, 27 August and Brean Down, S, 4 September (MT).

Aeshna mixta Latreille (Migrant Hawker). Single, Berrow, S, 9 August and two Walton Hill, nr Street, S, 23 August (RSC); mating pair, Chew Valley Lake, nr nr Chew Stoke, 3 September and one, Priddy Pools, nr Priddy, Mendip, S, same date; Black Down, Mendip, S, 4 September and Brean Down, S, same date (MT). One photographed in garden, Weston-super-Mare, 6 September (KHP).

Orthetrum cancellatum L. (Black-tailed Skimmer). Male, Catcott Heath, between Catcott and Catcott Burtle, S, 21 June (RSC).

Libellula depressa L. (Broad-bodied Chaser). Shapwick Heath, nr Shapwick, S, 31 May (ARN).

Libellula quadrimaculata L. (Four-spotted Chaser). Tadham Moor, nr Wedmore, S, 25 May (RSC).

Sympetrum striolatum Charpentier (Common Darter). One dead on road, Westbury-on-Trym, Bristol, 18 July and five, all females, Nailsea Moor, nr Nailsea, 29 July (RHP).

CRICKETS & GRASSHOPPERS (Orthoptera) by K.W. Miller.

Another poor year for this group. Presumably the atrocious summer weather of the previous year resulted in fewer eggs being laid whilst the poor spring of 1981 may have affected the emergence of nymphs from the reduced number of eggs.

Meconema thalassinum De Geer (Oak Bush Cricket). One new 2 km square record - two in bramble hedge, Hutton, 23 August (RSC).

Stenobothrus lineatus Panzer (Stripe-winged Grasshopper). Many in song, rough grassland, Rodway Hill, Mangotsfield, 29 July (RSC).

Leptophyes punctatissima Bosc. (Spotted Bush Cricket). One half-grown nymph, Clifton Down, Bristol, 28 July (JFB).

Pholidooptera griseoaptera De Geer (Dark Bush Cricket). Many first instar nymphs, Henleaze, Bristol, 9 May (JFB).

Omocestus viridulus L. (Common Green Grasshopper). Several singing, Rodway Hill, Mangotsfield, 29 July (RSC).

Chorthippus parallelus Zetterstedt (Meadow Grasshopper). Few stridulating, Walton Moor, Walton-in-Gordano, 7 July (JFB) and also at Rodway Hill, Mangotsfield, 29 July (RSC).

Myrmeleotettix maculatus Thunberg (Mottled Grasshopper). Several in song, Rodway Hill, Mangotsfield, 29 July (RSC).

TRUE FLIES (Diptera) by R.H. Poulding

The generally wet spring with below average sunshine resulted in fewer early Diptera than usual on the blossom of Sallow and Blackthorn, whilst a wet September, follwed by a cool and wetter October, prevented the formation of large concentrations of *Syrphidae, Tachinidae* and *Muscidae* - a feature of late summer and early autumn in most years. Although populations of the larger flies may have been low in numbers, the variety of different species recorded was notably increased. The short selection of species given in this report is a small fraction of the total recorded in Avon during the year but all data is used for both local and national recording schemes. Scientific names used are those given in Kloet and Kincks, *A Check List of British Insects*, Vol. Xl, Pt. 5, 2nd Ed., 1976.

Trichoceridea - Winter Gnats

Trichocera annulata Mg. Recorded from Congresbury, 31 December (RWR). Swarming winter gnats, chiefly *T. hyemalis* and *T. regelationis*, were abundant and widespread during the milder days at the end of December following the severe cold spell. *T. annulata* appears to be less abundant than either of the two common species.

Tabanidea - Horse Flies

Haematopota bigoti Gobert Six females and a single male, coastal meadow, Uphill, 12 July (RHP) - identification confirmed by R.M. Payne. The only previous record for Avon is of one at Tickenham, 3 July 1922, given by Audcent (1949) under the genus *Chrysozona Mg.*

Tabanus autumnalis L. Two females, Uphill, 12 July and one, almost certainly this species on stationary car, Ashton Vale, Bristol, 29 July. The only other record of a large tabanid was one in flight apparently drinking from a pond, Leigh Woods (Forestry Commission), nr Bristol - species not determined.

Asilidae - Robber Flies

Philonicus albiceps Loew Plentiful on dunes, Berrow, S, 9 August and a few, Uphill, on 23rd (RSC). This essentially coastal asilid hunts over sand dunes and is locally abundant at favourable sites.

Bombyliidae - Bee Flies

Bombylius major L. (Common Bee Fly). Less abundant than previous year with maximum of five, Leigh Woods (Forestry Commission), nr Bristol, 17 April. Singles reported from Sea Mills and Henleaze, Bristol, various dates, April - May and last noted 9 May. One in observer's garden adopted a curious posture when resting on vertical glass pane of greenhouse facing the evening sun. After alighting, the Bee Fly slowly angled head and body outwards to about 40 degrees from vertical, supporting body on tip of abdomen and with wing tips touching surface of glass (RHP).

Syrphidae - Hover Flies

Neoascia aenea Mg. Female on Marsh Marigold *(Caltha palustris)*, Dodington, nr Chipping Sodbury, 19 April. Audcent (1950) notes this small syrphid as uncommon and includes a single record for Avon at 'Bristol'.

Eumerous tuberculatus Rondani (Lesser Bulb Fly). Female on flowers of Lesser Bindweed *(Convolvulus Arvensis)*, river bank, Sea Mills, Bristol, 1 September. This species is infrequently recorded in Avon in contrast to *Merodon equestris* (Large Bulb Fly) which is common in gardens, June - August. Perhaps *E. tuberculatus* is overlooked because of its small size and blackish colouration.

Volucella bombylans L. Four on Hogweed *(Heracleum sphondylium)*, Dodington, June 14 - two were of the form var. *bombylans* (RHP); two, var. *plumata* Degeer, Clifton Down, 27 July (JFB). This species mimics Bumble Bees and although many intermediate forms occur, var. *bombylans* resembles *Bombus lapidarius* (Red-tailed Bumble Bee) and var. *plumata* is not unlike *B. terrestris* (Buff-tailed Bumble Bee).

Volucella pellucens L. Recorded from widespread localities, mostly as single specimens, including Dodington, nr Chipping Sodbury, Henleaze and Leigh Woods, Bristol, Portishead, Congresbury and Cleaves Wood, nr Wellow (JFB, RHP). Maximum of 14 at Leigh Woods (Forestry Commission), nr Bristol, 21 June - probably all males.

Volucella zonaria Poda This large syrphid was not reported in Avon in 1981 and with only a single record for 1980 after a number of sightings during the previous two years, suggests that this species has declined from a peak of relative abundance. Previously confined to south coast localities it has spread to many parts of Southern England over the last twenty years.

Chloropidae

Platycephalus planifrons Fab. Several bred from swollen galls in the stems of the Common Reed *(Phragmites australis)* found growing in Leigh Woods (Forestry Commission), nr Bristol, 5 April. A small area of reeds at the edge of the forest was heavily infested with galls and although this chloropid is often common where *Phragmites* is found, this is the first record of this species for Leigh Woods.

TRUE BUGS (Hemiptera) by R.S. Cropper

Heteroptera

A particulaly poor year which was no doubt due to weather conditions. The persistently wet spring must have greatly affected the hatching of heteropteran eggs which may well have already been low in numbers following the reduction in the number laid during the unfavourable weather of the previous summer.

Acanthosoma haemorrhoidale L. (Hawthorn Shieldbug). In garden, Henleaze, Bristol, 11 April and on Hawthorn, Axbridge, S, 23 May.

Elasmucha grisea L. (Parent Bug). Few on birch, Shapwick Heath, nr Shapwick, S, 9 August.

Eysarcoris fabricii Kirkaldy On Hedge Woundwort *(Stachys sylvatica)*, Mells, nr Frome, S, 17 July.

Dolycoris baccarum L. Two on Charlock *(Sinapis arvensis)*, Axbridge, S, June 7.

Troilus luridus Fab. On birch, Westhay Moor, nr Westhay, S, 13 September.

Rhacognathus punctatus L. On heather, Westhay Moor, nr Westhay, S, 15 Aug.

Ischodemus sabuleti Fallen Clustered abundantly on marsh plants along stretch of overgrown rhine, Chilton Moor, Chilton, nr Chilton Polden, S, 24 May. This is the second locality in the north of Somerset for this species which was first recorded for Somerset in 1978. It was previously only known from a site in Surrey and has spread westwards in recent years.

Nabis ferus L. At margin of rhine, nr Walton-in-Gordano, 13 September.

Dicyphus globulifer Fallen Three on Red Campion *(Silene dioica)*, Chilcompton, S, 10 May and two on White Campion *(S. alba)*, Charterhouse, Mendip, S, 28 June.

Heterocordylus genistae Scop. Several on Dyer's Greenweed *(Genista tinctoria)*, Max Meadows, Winscombe, 12 July.

Pithanus maerkeli Herrich-Schaffer Several swept from rank grass, Priddy, Mendip, S, 18 July.

Gerris gibbifer Schummel. Few on pool in University Botanic Garden, Leigh Woods, nr Bristol, 9 April.

Notonecta marmorea Fab. Orchardleigh Lake, nr Frome, S, 29 March.

N. maculata Fab. Several in pool, University Botanic Garden, Leigh Woods, nr Bristol, 9 April.

SAWFLIES, BEES, WASPS, ANTS etc. (Hymenoptera)

Formicidae (Ants)

Formica rufa L. (Wood Ant). No further localities discovered for this species during the current distribution survey. A visit to King's Wood and Ball Wood, nr Congresbury, by the Section in June found it much in evidence and several nests were found.

Vespinae (Social Wasps)

Vespa crabro L. (Hornet). Despite increased surveys as part of the current investigation into the declining status of this wasp, no records were received in 1981.

Dolichovespula sylvestris Scopoli (Tree Wasp). Queen feeding on blossom of Blackthorn *(Prunus spinosa)*, Sea Mills,Bristol, 1 April and one, same place on 9th; queen found dead in greenhouse, Henleaze, Bristol, 10 May and another dead in road, Southmead, Bristol, 4 August (RHP). Queen in house, Henleaze, Bristol, 9 August (JFB) and one feeding on Golden Rod *(Solidago sp.)* in garden, same locality, 30, 31 August.

According to the Provisional Atlas of the Insects of the British Isles, *Hymenoptera-Vespidae* (1979) published by the Biological Records Centre, the Tree Wasp has only been recorded from two 10km squares in Avon (ST 75 & 78) since 1950. In southern England *D. sylvestris* is not as common as *Vespula vulgaris* (Common Wasp) or *V. germanica* (German Wasp) but is widely distributed. The records for 1981 in Avon were incidental observations and all occurred in ST 57 suggesting that *D. sylvestris* is probably commoner in the county than recent distribution maps indicate.

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BRISTOL BOTANY IN 1981

by A.J. WILLIS

(Department of Botany, University of Sheffield)

The year 1981 was one of rather poor weather, the temperature showing marked fluctuations, the rainfall being very high and the hours of sunshine low (88% of normal). The total rainfall was 1056.8 mm, 120.7% of average, the highest value for many years. Although January was distinctly mild, and the driest month of the year (only 32.7 mm of rain), February was cold. March heralded much warmer weather (2.5°C above average), but it was very wet indeed (nearly three times the normal rainfall) and rather sunless. Despite snow in late April, this month and May were of average temperature, but June and July were colder and, like April and May, below normal for hours of sunshine. In contrast, August and September were warm and sunny, even though September was the wettest month of the year with 170.8 mm of rain. October was cold and very wet, but November warmer and drier. The year ended with very low temperatures and snow in December: 3.6° below average, and a lowest minimum of -11.9° at Long Ashton Research Station to which all meteorological records relate. In the last ten years, the lowest minimum values have averaged -7.1° and only in 1979 has such an extremely low value as -11.9° been approached. In 1981 there were 106 ground frosts, a figure well above average.

The mild conditions of December 1980 and of January 1981 resulted in early development and flowering of several garden and native plants in West Gloucestershire. For example, *Crataegus monogyna* was in almost full leaf at the end of January near Little Stoke and in flower in early March at Wickwar; also *Kerria japonica* and *Forsythia* spp., normally April flowerers, were in flower in late January. *Gagea lutea* was flowering in early March (some 2-3 weeks earlier than usual) at Littleton Wood, Glos. (A.L.G.). However, the sunless wet spring and damaging heavy snowfalls in April slowed up growth and by late May/early June development of the vegetation was about normal for the time of year.

In spite of the indifferent weather during the year, reports of persistence, spread or extensive flowering of species at or near previously known sites were frequent. *Ranunculus ophioglossifolius* was vigorous on Inglestone Common, G, showing an increase in numbers from 1980 and *Utricularia vulgaris* flowered well along several yards of rhine in Weston Moor, Gordano Valley, S, R.S.C. At Cheddar *Meconopsis cambrica* flowered well and recovered some of its old range, and *Sison amomum* was robust and up to 150 cm high near Churchill Green, S, P.J.M.N. The saprophytic orchid *Neottia nidus-avis* was flourishing in a deep thicket of Westridge Wood, Wotton-under-Edge, and a field was completely blue with flowering Succory, *Cichorium intybus,* near Weston Big Wood, S, C.K. and M.A.R.K. The small population of the diminutive *Cyperus fuscus* still remains on Walton Moor, Gordano Valley (R.S.C.), although its apparent absence in some years leads to fears of its extinction. Of particular note is the continued existence of *Vicia bithynica* on the bank of a road cutting near Winterbourne, G. First discovered here in 1905, it was known to persist in this station from 1918-1920 (from annotations by the Sandwiths in White's *Flora*) and to be still present in 1935. However, there have been no subsequent reports of the plant in this site, which has suffered at least two road widenings, until 1981 (A.L.G.).

Interesting records continue to be made in the Bristol area. New to the British Adventive list is the Caribbean sedge *Cyperus flavus*, growing on a railway line in the Cumberland Basin, Bristol. Another introduction new to Britain is the leguminous sub-tropical *Caesalpinia* cf. *spinosa*, raised from seedlings from Avonmouth Docks. A further rarity, from Sea Mills, is *Malva verticillata*, although this mallow is widely naturalized in southern and central Europe. The very local grass *Puccinellia fasciculata* is added to the flora of Somerset, the record from Berrow being new to v.c. 6 and this stretch of coastline. Second v.c. 6 records have been made of *Bromus inermis* at Odd Down, Bath, and *Rubus pampinosus* from Lord's Wood, Pensford. A number of new localities are recorded of *Rubus* species in v.c. 6 which help to fill gaps in our knowledge of the distribution of these brambles, neglected in the past. Assembled records for the Avon Gorge were given in these *Proceedings* last year (pp. 13-21) by C.M. Lovatt in the article entitled *The Rubi of the Avon Gorge.*

Among the conservation measures being pursued, cultivation of *Carex depauperata* has been successful, and a number of plants returned to the Somerset site to supplement the few specimens remaining. Seed has been germinated and seedlings produced (R.S.C.), possibly the first in cultivation.

On the literature side, the event of the year is the issue of the new *Flora of Somerset* by Captain R.G.B. Roe, R.N., published by the Somerset Archaeological and Natural History Society at Taunton. This *Flora* is the culmination of over fifteen years of effort by Captain Roe and his helpers who spent untold hours in systematic searching of tetrads. The publication of a reliable and up-to-date *Flora* is much to be welcomed; Captain Roe deserves warm congratulations on the successful completion of the work. However, besides the information given in the *Flora,* Captain Roe holds considerable detailed records of distribution on a 2 kilometre square (tetrad) basis. To make this information generally available would be very desirable and it is to be hoped that some way may be found to do this. It is in any event planned to publish additions and corrections to the *Flora* in the *Proceedings of the Somerset Archaeological and Natural History Society.* A further publication in 1981, also by the Somerset Arch. and Nat. Hist. Society, is *Steep Holm: a survey.* This covers prehistory and history (including industrial and military) and a very full survey of the natural history of the island. The lists of vascular plants are brought up-to-date and the recording of cryptogams, including lichens, is much extended.

A very full account of the past and present distribution of the rare grass *Gastridium ventricosum* in the Avon Gorge, together with features of its ecology, is given by C.M. Lovatt in a paper entitled 'The history, ecology and status of *Gastridium ventricosum* (Gouan) Schinz & Thell. in the Avon Gorge, Bristol' (*Watsonia,* 1981, Vol. 13, pp. 287-298). Now extant in only two sites, the plant was formerly known in seven other localities in the Gorge, the first published record being in 1789. A short note on '*Spartina* in the Severn estuary' by Mrs S.C. Holland is given in *Watsonia,* Vol. 14, 1982, pp. 70-71. Survey of the populations of *Spartina* showed that the fertile amphidiploid *Spartina anglica* is the dominant, but the male-sterile true *S.* x *townsendii,* although very much scarcer, occurs on both the east and west banks of the Severn.

BRISTOL BOTANY IN 1981

An article by Dr M.D. Crane entitled 'Arthur Broughton, a late eighteenth century botanist in Bristol and Jamaica' (*Archives of Natural History*, Vol. 10, pp. 317-330, 1981), includes an account of Dr Broughton's contribution to Bristol Botany. As a physician with botanical interests, he prepared lists of plants of Clifton and the Avon Gorge while he was in Bristol (he later settled in Jamaica). A herbarium book of 1779 prepared by him contains a number of interesting records for the Bristol district (detailed information is given about this book in a paper (A.J. Willis and D. Gledhill) in these *Proceedings* for 1970, pp. 53-57).

A field meeting of the Botanical Society of the British Isles, held in the Avon Gorge in June 1980, is reported in the February 1982 issue of *Watsonia* (Vol. 14, p. 106). Among the plants seen were *Nectaroscordum siculum, Rubus fuscicaulis* and *Cirsium erisithales*. A meeting of the British Bryological Society was also held in Bristol in the autumn of 1980. Visits were made to Ebbor Gorge and the Priddy Pool area of Mendip. The field meeting is reported by Mrs J. Appleyard in the *Bulletin of the British Bryological Society,* No. 37, 1981, pp. 13-14, and includes the new v.c. 6 record of the lead-tolerant *Ditrichum plumbicola* from Stock Hill, near Priddy.

The moss, first found by Mrs J. Appleyard in 1967 on limestone in Harptree Combe, S, and initially referred to *Eurhynchium pulchellum,* has now been investigated in detail and described under *Brachythecium appleyardiae* S.V. McAdam & A.J.E. Smith. A paper in the *Journal of Bryology* (1981, Vol. 11, pp. 591-598) entitled '*Brachythecium appleyardiae* sp. nov. in south-west England' describes and illustrates its features. The moss was later (1969) found in Chilcote Wood, near Wells, S, and more recently in Wiltshire (1978) and in Derbyshire (1981).

Mrs Joan Swanborough, who took an interest in the plants (including *Ophrys* × *pietzschii*) of the Bristol area, died after a long illness in 1981. She was active in the Wild Flower Society, helped in the preparation of the *Supplement to the Flora of Wiltshire* (1975) and was latterly the B.S.B.I. recorder for North Wiltshire (v.c. 7). As recorder for v.c. 7, she is to be succeeded by D.E. Green (151 Wellsway, Bath) to whom plant records in N. Wilts. should now be directed.

Name of contributors associated with several records, or with the determination of plants, are abbreviated thus:

T.C., T. Cairns
E.J.C., E.J. Clement
R.S.C., R.S. Cropper
I.F.G., Miss I.F. Gravestock
D.E.G., D.E. Green
A.L.G., A.L. Grenfell
C.K., Mrs C. Kitchen
M.A.R.K., M.A.R. Kitchen
P.J.M.N., P.J.M. Nethercott
R.M.P., R.M. Payne
R.D.R., R.D. Randall
R.G.B.R., Capt. R.G.B. Roe, R.N.
A.C.T., A.C. Titchen

G: Gloucestershire
S: Somerset

For details of the area covered by this report, see *Bristol Botany in 1978*, p. 35.

Polystichum setiferum (Forsk.) Woynar Yate Rocks, G, R.S.C. Also Coley, S, R.S.C.

P. aculeatum (L.) Roth Fry's Bottom Wood, Clutton, S, I.F.G.

Ranunculus bulbosus L. A double-flowered form, railway bank between Filton and Stoke Gifford, G, A.L.G. Much local publicity was given to this plant as it was first reported to be the Globe Flower (*Trollius europaeus* L.), possibly introduced from Scotland on train wheels, but when investigated (by A.L.G.) it was found to be only a garden outcast of *Ranunculus bulbosus* L. forma *flore pleno*. However this railway bank yielded a wealth of interesting and decreasing plants, including *Genista tinctoria* L., *Serratula tinctoria* L., *Betonica officinalis* L., and much *Primula veris* L. (as the site is being levelled the opportunity was taken by A.L.G. to transplant cowslips in the Monks Pool Nature Reserve, Winterbourne). Among aliens present were *Erigeron philadelphicus* L. and *Verbascum phlomoides* L. (A.L.G.)

A form with pale lemon-coloured flowers, persistent at least for the last three years, Durdham Down, Bristol, G, P.J.M.N.

R. arvensis L. A single plant on roadside at Goose Green, Yate, G, G.W. Garlick. This once widespread weed is now rare.

R. sardous Crantz In 1980 on Steep Holm, S, J.V. Carrington. Persistent and a small patch flowering well among the farm ruins in 1981, J.V. Carrington and R.S.C.

Nymphaea alba L. In a farm pond between Oldbury-on-Severn and Littleton-on-Severn, G, P.J.M.N. Probably a recent introduction, but thriving.

Ceratophyllum submersum L. A large quantity of this hornwort in brackish rhine, West Huntspill, S, R.S.C.

Glaucium flavum Crantz A large flowering and fruiting plant on wall along the River Brue at Burnham-on-Sea, S, R.S.C. Although persistent at Steart (v.c. 5), the plant has long been decreasing on the North Somerset coast. It was last recorded from Burnham (v.c. 6) in 1924; however, a solitary specimen was present in 1956 on the shingle near the base of Brean Down, P.J.M.N.

Fumaria capreolata L. With *F. bastardii* Bor. and *F. officinalis* L. in fine flowering condition on bare mounds of earth, Axbridge, S, R.S.C.

Fumaria muralis Sond. ex Koch ssp. *boraei* (Jord.) Pugsl. A single flowering plant, track leading to Cheddar Wood, Axbridge, S, R.S.C. Also two plants on rubbish dump, Odd Down, near Bath, S, D.E.G.

Draba muralis L. Garden weed, East Harptree, S, R.M.P. Not recorded from East Harptree since 1829.

Hypericum androsaemum L. Two large clumps, Hunstrete Plantation, near Chelwood, S, R.D.R. Persistent in shrubby road verge, Leigh Woods, Bristol S, C.G. Trapnell.

Helianthemum x *sulphureum* Willd. In 1980, a plant, believed to be this hybrid, in fairly closed vegetation almost at the crest of the down on a south-facing slope, Brean Down, S, C.M. Wilson, conf. R.G.B.R. The flowers were pale yellow, and the leaves with a grey-tomentose upper surface and revolute margins. The hybrid is well known from Purn Hill, and recorded previously from Brean Down.

H. canum (L.) Baumg. In a paper by Dr J.R. Etherington concerning limestone heath in the *Journal of Ecology*, Vol. 69 (March 1981), a record is shown (Table 3, p. 284) of this rockrose for Brean Down. This species is not known in Somerset, and Dr J.R. Etherington has confirmed that a mis-entry occurred.

Silene noctiflora L. On disturbed ground, Southmead Hospital, Bristol, G, C.K. and M.A.R.K. Also present were *Fumaria officinalis* L. ssp. *wirtgenii* (Koch) Arcangeli (det. A.L.G.), *Sisymbrium orientale* L., *Kickxia spuria* (L.) Dumort., *K. elatine* (L.) Dumort. and *Aethusa cynapium* L.

Moenchia erecta (L.) Gaertn., Mey. & Scherb. A quite large colony in a new site in rail cutting between Keynsham and Brislington, S, D.E.G. Also *Trifolium striatum* L.

Chenopodium polyspermum L. On rubbish dump, Odd Down, near Bath, S, D.E.G., det. E.J.C. Also a fair number of plants of *Nicandra physalodes* (L.) Gaertn.

Geranium pusillum L. A large colony, with *Sedum sexangulare* L. and *Trifolium scabrum* L., Wick Rocks, G, D.E.G.

G. purpureum Vill. A strong colony of about a hundred plants on transported shingle on disused railway sidings, Yate, G, L.J. Margetts. The plants were all completely prostrate, as in ssp. *forsteri* (Wilmott) H.G. Bak. Associated plants on this stretch of sidings included *Epilobium ciliatum* Rafin. (*E. adenocaulon* Hausskn.) × *E. lanceolatum* Seb. & Mauri, *Rubus ulmifolius* Schott, *R. rubritinctus* W.C.R. Wats., *Potentilla recta* L., *Linaria repens* (L.) Mill., *L.* × *sepium* Allman, *Senecio erucifolius* L., *S. viscosus* L., *Verbascum nigrum* L., and *Vulpia myuros* (L.) C.C. Gmel., L.J. Margetts.

Two plants of *G. purpureum* Vill. also on old walls, Brandon Hill, Bristol, G, A.C.T.

Trifolium scabrum L. A small patch, with *Aphanes arvensis* L., on fairly bare rock, Hellenge Hill, Bleadon, S, C.K. and M.A.R.K. Persistent at Burnham, S, R.S.C., and also along old sea wall, New Passage, G, C.K. and M.A.R.K.

Anthyllis vulneraria L. Railway bank, Cranmore, S, R.S.C.

Vicea lutea L. Waste ground, St. Philips, Bristol, G, and nearby *Anaphalis margaritacea* (L.) Benth., A.L.G.

V. bithynica (L.) L. Abundant over some 300 yards of the north bank of road cutting, near parish boundary, Winterbourne, G, A.L.G. Also on the central reservation and bank south of the road. The persistence of this local rarity, discovered here by Bucknall in 1905 (White, *Flora*), is remarkable; the road, now a busy dual carriageway, has been extensively widened on several occasions since the report in 1935 by C. and N.Y. Sandwith of the continued existence of *V. bithynica* here. Nearby was a large, well-naturalized population of *Allium schoenoprasum* L., A.L.G. *V. bithynica* was abundant along a hedge, Chew Valley reservoir, S, R.M.P.

Lathyrus nissolia L. More than a thousand plants on railway embankment near Saltford, S, D.E.G. Previously known from this site by D. Fry (see White, *Flora,* p.252).

Rubus nessensis W. Hall Rides in Shepton Forest, S, R.D.R.

R. lindleianus Lees Stephen's Hill, near Hallatrow, S, R.D.R. Also *R. rufescens* Muell. & Lefèv. and *R. lanaticaulis* Edees & Newton (*R. hebecaulis* sensu Wats.).

R. pampinosus Lees (*R. favonii* W.C.R. Wats.) Lord's Wood, near Pensford, S, R.D.R., det. A. Newton. The second record for this bramble for v.c. 6. The first record is from 'Leigh Woods, Clifton'. This is based on a specimen collected by Charles Bailey on 15 Oct. 1888 (MANCH) and named '*Rubus rhamnifolius*' by J.G. Baker (per A. Newton).

R. rubritinctus W.C.R. Wats. Greyfield Wood, west of High Littleton, S, and Hunstrete Plantation, near Chelwood, S, R.D.R.

R. echinatus Lindl. Stephen's Hill, near Hallatrow, S, Hunstrete Plantation, near Chelwood, S, and Fry's Bottom, near Pensford, S, R.D.R.

R. glareosus Rogers Greyfield Wood, near High Littleton, S, R.D.R.

R. diversus W.C.R. Wats. Abundant in Hunstrete Plantation, near Chelwood, S, R.D.R.

Sedum forsteranum Sm. Rubbish tip, Kingsweston, near Bristol, G, I.F.G.

Chrysosplenium alternifolium L. Several patches by Little Avon River, Damery, G, R.S.C. Harptree Combe, S, R.M.P.

Epilobium tetragonum L. ssp. *lamyi* (F.W. Schultz) Nyman Waste ground, Bedminster Down, S, Mrs O.M. Stewart, det. D. McKean, per R.G.B.R.

Apium inundatum (L.) Reichb. f. Pond, Blackdown on Mendip, S, D.E.G. and T.C. Also *Menyanthes trifoliata* L. in boggy area.

Polygonum amphibium L. The terrestrial form of this plant flowering on bank of rhine adjoining old tip, Kingsweston, G, I.F.G.

Rumex conglomeratus Murr. × *R. obtusifolius* L. (*R.* × *abortivus* Ruhmer) In Dovercourt Road, Bristol, G, I.F.G., det. D.H. Kent. Basal leaves were missing but D.H. Kent 'suspects this is the plant'. Not previously recorded in v.c. 34.

Cuscuta epithymum (L.) L. Over an area of about five square metres, St. Catherine's, near Bath, S, D.E.G. Also at South Stoke, near Bath, S, D.E.G. and R.D.R.

Atropa bella-donna L. A fine plant, Willsbridge Hill, near Bristol, G, A.C.T. Persistent (many fine plants) in Westridge Wood, Wotton-under-Edge, G, R.S.C.

Verbascum virgatum Stokes A single plant, bank, Axbridge, S, R.S.C.

Mentha × *piperita* L. Wick Rocks, G, C.K. and M.A.R.K. *Ecballium elaterium* (L.) A. Richard is persistent in this site.

Valerianella carinata Lois. A few plants in flower and fruit by wall, lane, Axbridge, S, R.S.C.

Gnaphalium uliginosum L. In very considerable quantity in newly-grassed area (imported soil) of the disused Bedminster tip, S, A.L.G.

Artemisia absinthium L. One plant by roadside, Fry's Bottom, near Pensford, S, R.D.R.

Lactuca virosa L. Much more widespread and abundant in the Cumberland Basin area than formerly realized; waste ground, St. Philips, Bristol, G; roadside, St. Werburgh's, Bristol, G, A.L.G.

Alisma lanceolatum With. Several plants in rhine, Burtle Hill, S, R.S.C. Also *Veronica scutellata* L. on Burtle Moor.

Zannichellia palustris L. Rhine near Honey Hall, near Churchill, S, P.J.M.N.

Spiranthes spiralis (L.) Chevall. Frequent at South Stoke, near Bath, S, D.E.G. and R.D.R. Also plentiful was *Campanula glomerata* L.; other associates included *Centaurium pulchellum* (Sw.) Druce and *Acinos arvensis* (Lam.) Dandy.

Anacamptis pyramidalis (L.) Rich. A colony of more than two hundred flowering plants, together with *Ophrys apifera* Huds., Hursley Hill, near Pensford, S, P.J. Chadwick. Also on West Hill, near Wraxall, S.

Typha latifolia L. Plentiful in rhine on south side of Berkeley Power Station, G; also a dense stand, covering several square metres, near Olveston, G, P.J.M.N. Not very common in West Gloucestershire (see White, *Flora*, p.602), but these sites are additional to those given in 'Bristol Botany in 1978'.

Eriophorum angustifolium Honck. Downhead Common, S, D.E.G. and R.D.R. This site is improving after being scraped by bulldozers, and a number of species are evident which have not been seen in recent years, including *Juncus squarrosus* L., *Platanthera chlorantha* (Custer) Reichb., *Dactylorhiza maculata* (L.) Soó ssp. *ericetorum* (E.F. Linton) Hunt & Summerhayes, *Carex binervis* Sm. and *C. pilulifera* L., D.E.G. and R.D.R.

Scirpus setaceus L. Shapwick Heath, S, and Emborough, S, R.S.C. Also at Emborough were *Hypericum pulchrum* L., *Pedicularis sylvatica* L., *Carex panicea* L. and *C. nigra* (L.) Reichard.

S. fluitans L. Pond on Blackdown on Mendip, S, D.E.G. and T.C. Not recorded from this area for many years.

Cyperus fuscus L. A number of extremely small plants flowering on fairly bare peat, Walton Moor, S, R.S.C. This rare species has long been known from this site, but not seen since 1976.

Carex strigosa Huds. Westridge Wood, Wotton-under-Edge, G, R.S.C. Persistent here are several patches of *Hypericum maculatum* Crantz.

C. pallescens L. Coleford, S, D.E.G. Associated with *C. hostiana* DC., *C. pulicaris* L., *C. ovalis* Gooden., *C. echinata* Murr., *Oenanthe pimpinelloides* L., *Cirsium dissectum* (L.) Hill, *Scutellaria galericulata* L., *Dactylorhiza majalis* (Reichb.) Hunt & Summerhayes, *D. maculata* (L.) Soó ssp. *ericetorum* (E.F. Linton) Hunt & Summerhayes, and *Platanthera chlorantha* (Custer) Reichb., D.E.G., R.D.R. and T.C. Many of these plants, previously known from Stratton Common to the north-west, are feared lost from the Common area which has been largely cleared, although the woodland survives.

C. disticha Huds. Charterhouse, S, R.S.C. A rather rare and local sedge.

× *Festulolium loliaceum* (Huds.) P. Fourn. River bank, Saltford, S, D.E.G.

Puccinellia fasciculata (Torr.) Bicknell Damp ground behind the shore, Berrow, S, Mrs O.M. Stewart, det. P.J.O. Trist, per R.G.B.R. This is a first record for v.c. 6 for this grass.

Calamagrostis epigejos (L.) Roth Disused sidings near old railway station, Glastonbury, S, R.M.P.

Agrostis gigantea Roth Railway, St. Philips, Bristol, G; St. Werburgh's, Bristol, G; Brislington Tip, S, A.L.G.

ALIENS. *Corydalis lutea* (L.) DC. Wall bordering stream, Dovercourt Road, Bristol, G, I.F.G. Also *Melilotus alba* Medic.

Rhynchosinapis cheiranthos (Vill.) Dandy In considerable quantity, with much *Lamium hybridum* L., on tipped railway ballast (used for in-fill of marshy ground) near St. Andrew's Road Station, Avonmouth, G, A.L.G.

Erysimum cheiranthoides L. Damp track, margin of Chew Valley reservoir, S, R.M.P.

Lychnis coronaria (L.) Desr. In several places, St. Philips, Bristol, G, A.L.G.

Malva verticillata L. Two plants of this very rare British casual (believed new to the Bristol Adventive Flora), roadside verge, Sea Mills, G, A.L.G. When found in late October, the seeds were already germinating in the accrescent calyces.

Caesalpinia cf. *spinosa* Kuntze Seedlings gathered at Avonmouth Docks, G, in 1978 and 1979 and grown on by Mrs M.C. Foster and others have been named thus by A.O. Chater, leg. T.G. Evans and A.L.G. *C. spinosa,* whose seeds are imported for extraction of tannin, is a legume with imparipinnate, nyctinastic leaves. It is new to the Bristol Adventive Flora and to Britain.

Lupinus polyphyllus Lindl. A solitary clump on the bank of motorway at Hambrook, G, A.L.G. Although common on railway banks in the Midlands and northwards, the plant is very scarce in the Bristol area.

Galega officinalis L. A single plant, red ochre quarry, Winford, S, R.M.P.

Colutea arborescens L. The bush reported in 1980 at St. Philips, Bristol, G, was destroyed by development but several very large bushes were noted on a railway bank north of Stapleton Road Station, Eastville, G, A.L.G.

Rubus elegantispinosus (Schumach) Weber On river bank, Bath, S, R.D.R. This garden escape is a German species cultivated for its fruit.

Hedera algeriensis Hort. Meridian Vale, Bristol, G, I.F.G., det. Dr H. McAllister. Dr McAllister regards the plant as either a North African variant or a S. France variant. The large glossy leaves of this taxon, with $2n = 96$, are usually three-lobed.

Coriandrum sativum L. Shirehampton Station, G, I.F.G.

Euphorbia cyparissias L. Well naturalized in 1980 on rubble on disused railway line near Fishponds Station, G, A.L.G.

Polygonum polystachyum Wall. ex Meisn. Well established in a copse, East Harptree, S, R.M.P.

Cyclamen hederifolium Ait. Originally planted outside the old Vicarage, this species has colonized extensively in turf in St. Mary's Churchyard and Church Road, Leigh Woods, Bristol, S, C.G. Trapnell.

Lamium maculatum L. Well established, Worle Hill, Weston-super-Mare, S, C.K. and M.A.R.K.

Campanula rapunculoides L. Road side, Tor Hill, Chewton Mendip, S, D.E.G. and T.C.

Lonicera etrusca Santi Lane near Bell Barn Road, Stoke Bishop, G, I.F.G., det. at Kew. Doubtless a garden escape.

Solidago gigantea Ait. A large patch on roadside verge, Henfield, G, A.L.G. The hybrid *S.* × *niederederi* E. Khek, reported from Winterbourne Down, G, in 1980, has been seriously depleted by industrial development.

Erigeron philadephicus L. Abundant, railway bank between Filton and Stoke Gifford, G, A.L.G. (see entry under *Ranunculus bulbosus* L.). Also on railway bank, Sea Mills, G, Mrs M.C. Hewitt, det. A.L.G. This species is now a rare alien in Britain.

Cirsium erisithales (Jacq.) Scop. Two more plants far from the first reported site (see *Bristol Botany in 1980*) in Nightingale Valley, Leigh Woods, Bristol, S, A.L.G. & R.V. Russell. This area could provide suitable ground for its further spread.

Scilla sibirica Andr. The Monument, Lansdown, near Bath, S, C.K. and M.A.R.K., det. A.L.G.

S. messenaica Boiss. Several clumps, growing with bluebells, at edge of Smallcombe Wood, Bath, S, R.D.R., det. D. McClintock.

Cyperus flavus (Vahl) Nees A solitary clump on railway line, Cumberland Basin, Bristol, G, in 1980, A.L.G. and C.M. Lovatt, det. Dr C.D. Adams (BM). This is a first British record of this Caribbean sedge which is widely naturalized in the central and southern states of the USA. It may have been introduced from the latter. The identification was made on material collected in 1980 and grown on by A.L.G. The plant persisted in 1981 but was endangered by the use of herbicides. Also present was an unusual form of *Cyperus longus* L., det. Dr C.D. Adams, with weakly trigonous (almost subterete) stems contrasting with the sharply trigonous stems of the type. New to the Bristol Adventive List.

Bromus inermis Leyss. Rubbish dump, Odd Down, near Bath, S, D.E.G. and R.D.R., det. E.J.C. This is the second record for v.c. 6; the grass was first recorded for North Somerset in 1926 by the Sandwiths.

Cynodon dactylon (L.) Pers. A large patch, Brislington Tip, S, A.L.G. and A.C.T. Previously overlooked.

Echinochloa frumentacea Link With *Setaria italica* L., Elberton Tip, G, A.L.G.

Digitaria ciliaris (Retz.) Koel. By Christmas Steps, Bristol, G, with *D. sanguinalis* (L.) Scop., *Panicum miliaceum* L., *Phalaris canariensis* L. and *Setaria viridis* (L.) Beauv., A.L.G., C.K. and M.A.R.K. *S. viridis* also on roadsides at St. Philips, Bristol, G, and at Hicks Common, Winterbourne, G, A.L.G.

BRYOPHYTES. A list containing fifty-five taxa of mosses and ten species of liverworts is given for Steep Holm by Mrs J. Appleyard in *Steep Holm: a survey*, pp. 63-64 (see Introductory section). Corticolous species are scanty. Among the mosses listed are *Bryum bornholmense* Wink & Ruthe, *B. ruderale* Crundw. & Nyh. and *Pottia crinita* Br. Eur. Hepatics include *Lejeunea lamacerina* Gottsche ex Steph. var. *azorica* (Steph.) Greig-Smith and *Marchesinia mackaii* (Hook.) Gray.

LICHENS. Some eighty-six species of lichen were recorded by Dr O.L. Gilbert in April 1980 on Steep Holm. Details are given in *Steep Holm: a survey*, pp. 64-66 (see above). A citrine-green population of *Candelariella medians* was discovered on the island surrounded by a large population of the yellow f. *medians* on a limestone cliff. This is the only known locality for *Candelariella medians* f. *steepholmensis* O. Gilbert which is described by O.L. Gilbert, A. Henderson and P.W. James in a paper entitled 'Citrine-green taxa in the genus *Candelariella*' (*Lichenologist*, 1981, 13, pp. 249-251). A lichen which is rare nationally but found in the island (on cement surfaces in the dark) is *Bacidia arnoldiana* Körber.

I thank everyone who has supplied records and helped with these, notably Mr A.L. Grenfell and Mr P.J.M. Nethercott. I am indebted to Long Ashton Research Station for the supply of meteorological records.

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REPORT OF COUNCIL, 1982

Membership at the end of the year was 647, including 3 juniors. Council has expressed concern about the decline in membership; for example in 1980 the total membership was 751.

At the A.G.M. the Officers and Members of Council were elected with Mr J.G. Prince as President.

The Annual Supper, held in April, was well supported and Dr J.F.W. McOmie spoke about his visit to Japan.

Money from the Conservation Fund has been used to sponsor three projects, two on the Wetmoor Reserve in North Avon and one in Litley Woods. In addition a donation has been made to the Avon Wildlife Trust's 'Threatened Habitats Appeal'.

Once again the Society wishes to place on record its sincere thanks to those members who hand-deliver the Bulletin and save the Society money which can be put to more rewarding use; about half the Bulletins are now delivered by hand.

Mrs I.C.I. Milton, for many years a member of the Society, by her will left the Society a share in the residue of her estate subject to certain life interests.

We record with regret the deaths of the following members: Mrs D.I. Taylor, Miss M. Bowen, Mrs J. Stocker and Prof. F. Coles Phillips - a past President.

ACCOUNT OF GENERAL MEETINGS, 1982

January:	Presidential Address - "International Geology and Early Earth History", by Dr John Cowie.
February:	"Woodlands as a Natural Habitat", by L.A. Cram.
March:	"Exmoor Landscapes and Conservation", by Dr L.F. Curtis.
October:	"The Work of the Conservation Officer of the Avon Wildlife Trust", by Chris Johnson.
November:	"Wildlife on the Air", by Dilys Breese.
December:	Members' Evening - "Introductions". Many species of plants and living creatures have been introduced either deliberately or by accident and some have been startlingly successful. Messrs R.A. Burberry, A.L. Grenfell and S.M. Taylor described some interesting cases and also some other kinds of introductions (e.g. trains and motor cars) which have had major effects on wildlife.

GENERAL FIELD MEETINGS, 1982

Thirteen field meetings and three mid-week rambles were held. Attendance was disappointing on many of the meetings. A list of the meetings with leaders and an indication of things seen is given below. A fuller account is kept in the records of the Field Committee. In the following list the leader is given first, followed by the area visited.

27 Feb Miss R.C. Lee. Ashton Court and its environs. A walk through the park and woodland, along lanes and tracks by Failand and Abbots Pool. Plants and birds.

20 Mar Dr A.F. Devonshire. Welsh Folk Museum at St Fagan's Castle, and a short visit to Caerwent, the tribal capital built by the Romans for the Silures, where there is a nearly complete set of Roman walls still standing.

9 Apr Mrs V.J. Kenney. Malvern Hills. Plants and birds, and views from Midsummer Hill Iron Age Fort and Chase End Hill.

1 May Dr A.F. Devonshire. Kew Gardens. An all-day visit enabled members to explore the gardens fully and to see, especially, the new Alpine House.

11 May Mr D.A.C. Cullen. An evening walk from Publow, along the R. Chew and into Lord's Wood. Plants and evening bird song.

15 May Miss C. Groves. Sandford Orcas Manor near Sherborne, a Tudor house with interesting furniture and old stained glass, standing in an old garden. In the afternoon the party attended the Cannington Farm Institute Open Day, where there were many instructive displays.

15 Jun Miss R.C. Lee. An afternoon walk along the Cadbury Camp ridge. Limestone plants, birds and good views.

19 Jun Miss R.C. Lee. Bredon Hill, near Tewkesbury. The party walked over the hill from Overbury to Elmley Castle. A number of plants were found, some birds, and excellent views fom the top.

22 Jun Mr A.C. Titchen. An evening visit to Brent Knoll. Plants, good views of old field systems, and Iron Age Hill Fort on the top.

4 Jul Dr A.F. Devonshire. (Joint meeting with Ornithological Section). New Forest. A walk through the Bolderwood area, including Ancient and Ornamental Woodland.

12 Aug Miss R.C. Lee. An evening walk through Blaise Castle woodlands, for plants and birds.

18 Aug Mrs V.J. Kenney. Afternoon walk along Frome Valley from Frenchay via Hambrook Mill and Bury Hill. Plants and birds.

8 Sep Dr A.F. Devonshire. Afternoon walk in Ashton Court to look at the many fine specimens of trees there, and to take some girth measurements.

9 Sep Mr R.M. Curber. Christchurch Harbour. Good views of sea birds and waders were obtained.

30 Oct Dr A.F. Devonshire. Westonbirt Arboretum. The party visited the main arboretum which is famous for the display of acers, and later went into Silk Wood, to see the wide range of British and introduced broad-leaved trees.

27 Nov Mr D.A.C. Cullen. Afternoon walk along Clevedon Sea Wall. Unfortunately there was a heavy sea mist most of the time and very few birds were visible, though flocks of waders could be heard calling.

RACHEL C. LEE
Hon. Field Secretary

Accounts for the y

1981			
	Members' Subscriptions:		
2077	Full members	2490.50	
178	Full members of the same household	267.75	
36	Corresponding members	50.50	
33	Associates	24.00	
11	Juniors	6.00	
30	Affiliated societies	42.00	2880.75
2365			
4	Donations (including £17.80 for library purposes)		31.80
35	Proceedings: Grant	35.00	
118	Sales	91.99	126.99
39	Sales of journals and books		43.35
6	Buffet Supper: profit		-
102	Interest on deposit account		124.86
3	Interest from National Savings Bank		2.75
17	Interest on Bonds		17.00
80	Members' contributions to the Harry Savory Illustrations Fund		16.05
3	Members' contributions to the Conservation Appeal		16.50
3	South Brecon Field Study Centre, donation for conservation purposes		100.00
-	Return of Mammal Section balance		48.43
1064	Balance from last account		1119.02
£3839			£4527.50

P.J.M. NETHERCOTT
Hon. Treasurer
10 January 1983

31 December 1982

1981			
828	General printing and stationery	742.26	
364	Postages and telephone	516.35	1258.61
983	Proceedings (1981)		1057.17
123	Books	58.70	
125	Subscriptions for journals etc.	134.15	
15	Fire Insurance (library)	15.00	207.85
8	Contributions to SWNU etc.		11.75
-	Contributions to conservation projects and appeals		74.75
39	Expenses of general indoor meetings including hire of rooms		276.57
28	Field Committee, loss on meetings		49.80
-	Buffet Supper, loss (£8.87) pre-payment 1983 (£10.00)		18.87
205	Grants to Sections:		
	Botanical	50.00	
	Ornithological	120.00	
	Geological	80.00	
	Entomological	25.00	275.00
2	Refund of overpaid subscription		-
	Balances to next account:		
185	Cash in bank, current account	367.86	
548	Cash in bank, deposit account	573.12	
56	Deposit in National Savings Bank	58.15	
200	£200 8½% British Savings Bonds	200.00	
130	In hands of Field Committee	80.20	
-	In hands of Treasurer	17.80	1297.13
	Notes: (1) Earmarked for the Harry Savory Illustrations Fund £232.49		
	(2) Earmarked for the Conservation Appeal £121.85		
	(3) These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £187.44		
£3839			£4527.50

Audited and found correct
T.B. SILCOCKS
Hon. Auditor
7 February 1983

Accounts for the ye 31 December 1982

1981			
	Members' Subscriptions:		
2077	Full members	2490.50	
178	Full members of the same household	267.75	
36	Corresponding members	50.50	
33	Associates	24.00	
11	Juniors	6.00	
30	Affiliated societies	42.00	2880.75
2365			
4	Donations (including £17.80 for library purposes)		31.80
35	Proceedings: Grant	35.00	
118	Sales	91.99	126.99
39	Sales of journals and books		43.35
6	Buffet Supper: profit		-
102	Interest on deposit account		124.86
3	Interest from National Savings Bank		2.75
17	Interest on Bonds		17.00
80	Members' contributions to the Harry Savory Illustrations Fund		16.05
3	Members' contributions to the Conservation Appeal		16.50
3	South Brecon Field Study Centre, donation for conservation purposes		100.00
-	Return of Mammal Section balance		48.43
1064	Balance from last account		1119.02
£3839			£4527.50

P.J.M. NETHERCOTT
Hon. Treasurer
10 January 1983

1981			
828	General printing and stationery	742.26	
364	Postages and telephone	516.35	1258.61
983	Proceedings (1981)		1057.17
123	Books	58.70	
125	Subscriptions for journals etc.	134.15	
15	Fire Insurance (library)	15.00	207.85
8	Contributions to SWNU etc.		11.75
-	Contributions to conservation projects and appeals		74.75
39	Expenses of general indoor meetings including hire of rooms		276.57
28	Field Committee, loss on meetings		49.80
-	Buffet Supper, loss (£8.87) pre-payment 1983 (£10.00)		18.87
205	Grants to Sections:		
	Botanical	50.00	
	Ornithological	120.00	
	Geological	80.00	
	Entomological	25.00	275.00
2	Refund of overpaid subscription		-
	Balances to next account:		
185	Cash in bank, current account	367.86	
548	Cash in bank, deposit account	573.12	
56	Deposit in National Savings Bank	58.15	
200	£200 8½% British Savings Bonds	200.00	
130	In hands of Field Committee	80.20	
-	In hands of Treasurer	17.80	1297.13
£3839			£4527.50

Notes: (1) Earmarked for the Harry Savory Illustrations Fund £232.49

(2) Earmarked for the Conservation Appeal £121.85

(3) These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £187.44

Audited and found correct
T.B. SILCOCKS
Hon. Auditor
7 February 1983

REPORT OF THE BOTANICAL SECTION, 1982

At the Annual General Meeting held in the Schools Room of the City Museum on 25 January, 1982, the following were elected:- President: Dr A.F. Devonshire; Hon. Secretary & Treasurer: Mr A.C. Titchen; Committee: Miss I.F. Gravestock, Mrs N. Vaughan Davies, Mrs T.B. Silcocks, Mr P.J.M. Nethercott, Dr M.C. Smith, Mr C.M. Lovatt, Mr C.W. Hurfurt and Mr A.L. Grenfell. (Mr R.M. Payne joined the Committee later in the year).

The following winter meetings were held:-

25 Jan	Annual General Meeting; The Compilation of the Flora of Somerset, by Capt. R.G.B. Roe: followed by Members' Evening.
22 Feb	Plant Hunting in Iran, by Prof. R.J. Hewer.
22 Mar	Doubtfully native English Plants, by Dr A.F. Devonshire
25 Oct	Members' Evening with transparencies.
22 Nov	Compilation of the Flora of Cyprus, by Mr R.D. Meikle.
13 Dec	Nature Conservation in Avon, by Mr R.G. Corns

The following field excursions took place, under the leadership of those shown:-

13 Mar	Identification of mosses, Mr G.W. Garlick.
25 Apr	Ubley Warren & Charterhouse, Mendip, Mr A.C. Titchen.
22 May	Crook Peak, Mr R.M. Payne.
5 Jun	Berrow, Dr N. Malcolm.
27 Jun	Sand Point, Mrs M.A. Silcocks.
10 Jul	Banner Down, nr Bath, Mr C.W. Hurfurt.
14 Aug	Kingston Seymour, Mr P.J.M. Nethercott.
6 Sep	St Philips Marsh and environs, Mr A.L. Grenfell.
18 Sep	*Sorbi* and aliens, Bristol, Mr A.L. Grenfell (joint with Wild Flower Society).

The following evening meetings were also held:-

9 Jun	Willsbridge, Mr C.W. Hurfurt.
16 Jun	Lanes of Stoke Bishop, Miss I.F. Gravestock.
6 Jul	Poisonous plants at Bracken Hill, Dr M.C. Smith.
21 Jul	Botanical walkabout in Bristol, Dr A.F. Devonshire (joint with The Avon Wildlife Trust).
28 Jul	Glen Frome, Mr A.L. Grenfell.
3 Aug	Trees and Shrubs in Clifton, Mr A.C. Titchen.

Full reports of the above meetings are given in the Botanical Section Newsletters.

During the year 15 members attended a short course entitled "Those Wretched Yellow Things", by Mr A.C. Titchen, held in the Study Room of the University Botanic Garden. Our thanks our due to Dr M.C. Smith for specimens and accommodation.

A.C. TITCHEN, Hon. Secretary

REPORT OF THE ENTOMOLOGICAL SECTION, 1982

At the Annual General Meeting, the following officers were elected:- Hon. Secretary: G.W. Sorrell; Hon. Treasurer: R.E. Rowe. It was agreed that the Committee would consist of the Recorders.

There were four indoor meetings:-

11 Feb	Hoverflies, by R.H. Poulding.
11 Mar	Fieldwork Meeting.
11 Nov	Photographic Evening, by D. Bissell.

10 Dec	What use is a Local Record Centre?, by L. Way.

The following field excursions took place:-

23 May	Midger Wood.
26 Jun	Shapwick Heath.
24 Jul	Conham River Park.
21 Aug	Sand Point.

G.W. SORRELL, Hon. Secretary

REPORT OF THE GEOLOGICAL SECTION, 1982

The following officers were elected at the Annual General Meeting held on 20 January 1982 in the Geology Lecture Theatre, Queen's Building:- President: Dr A.B. Hawkins; Vice-President: Mr P. Thompson; Hon. Secretary/ Treasurer: Mrs G.B. Castle; Field Secretary: Dr D. Hamilton; Ex-officio, Dr D.L. Dineley; Committee: Mr M. Curtis, Mr V. Dennison, Mrs M. Gray, Mrs G. Hamilton, Mr T. Harrison, Mr N. Hollingsworth, Dr A. Mathieson, Miss E. Pounder.

In the field, five excursions were arranged. These, together with their leaders, were as follows:-

25 Apr	Cloford and Holwell, Mr C. Copp.
23 May	Tytherington Quarry, Mr D. Whiteside.
13 Jun	Westbury Claypit, Miss S. Swanborough.
4 Jul	Lydney ORS and the Severn Tidal Stream, Dr D. Hamilton.
26 Sep	William Smith Trail, Mr J. George.

The winter programme included:-

20 Jan	'Some Contrasting Mountain Landscapes', by Mr P. Thompson (Presidential Address).
17 Feb	'A Failed Ocean and Volcanogenesis', by Dr J. Harpum.
17 Mar	'Geological Mapping of Weston-super-Mare', by Mr G.W. Green.
20 Oct	Collectors Evening.
17 Nov	'The Disposal of Radio-Active Waste', by Dr J. Mather.
15 Dec	'The Geology of Wine', by Dr Peigi Wallace.

GLORIA CASTLE, Hon. Secretary

REPORT OF THE ORNITHOLOGICAL SECTION, 1982

During 1982 the Section held seven indoor meetings, one of which was a beginner's meeting on woodlands. Four of these meetings were addressed by ornithologists of national standing; they were M.A. Ogilvie, J.J. Flegg, I. Newton and J. Rayner. The Section also participated in a fieldwork meeting organised by the Bristol Ornithological Club. Twenty eight fieldwalks were arranged, two were called off due to bad weather. The average attendance was about twelve members. The outstanding visit was to Porton Down which took place by special permission of the Chemical Defence Establishment.

The Section took part in a number of regional, national and local surveys. These were (1) a BTO breeding waders of wet meadows survey showing a reasonable number of Lapwing and Redshank sites with the possibility of breeding attempts by six other wader species, (2) the BTO winter atlas project continued, (3) the BTO nest record also continued, (4) a BTO survey of breeding sites of the Cirl Bunting showing that this species still has a tenuous hold in our area, (5) The Birds of Estuaries Enquiry now being revitalised and (6) the national wildfowl counts. The local enquiries included birds in gardens, overwintering warblers, breeding sites of Skylark and Meadow Pipit, common birds of prey in Avon, the start of an Owl study, and a look at Turtle Doves.

In October both the 1981 Avon Bird Report and the 1982 Fieldwork Review appeared. The Bird Report was the third to appear with an illustrated cover, and the presentation of the fieldwork review was to a higher standard than the previous issues.

Most of the activities of the Section were well supported, this was particularly true of the fieldwork. The attendance at indoor meetings was slightly lower than last year's; the causes could be the weather, timing and the Society's increased subscription. I feel that the Section has had a good year and that this will continue in 1983.

H.E. ROSE, Hon. Secretary

REPORT OF THE LIBRARIAN, 1982

Although Library statistics have been influenced by the closure of the library towards the end of the year they do not hide the trend in increasing usage. 240 visits were paid by 50 members who between them borrowed 300 items. The number of registered readers is now 105. 19 books were bought and 21 given, for which we thank Mrs Simpson, Mr P.J.M. Nethercott and Dr J.F.W. McOmie. Mr M.C. Curtis is thanked for geological offprints and Mr P.J. Chadwick and Dr H.E. Rose for over 20 ornithological items. These gifts, many of which fill gaps in our collection, are much appreciated. Certain books from the late Junior Section Library have been incorporated into the main library. A number of geological journals in excess of our requirements were given by Dr Hamilton to be sold to benefit library funds. We were one of three institutions to share the library of the late Mr H.W. Turner. Over 80 books, a number of offprints and many assorted literary items, some of archival value, were received with much appreciation.

The de-humidifier loaned to us was effective in ridding the Library room and its contents of the damp which had reached worrying proportions. Mrs A.J. Hollowell is to be thanked for her efforts in this context. Mr Nethercott has photocopied almost 400 sheets of text from the archives in order that they may be consulted by members. Because of ill-health Dr T.E.T. Bond retired from the Committee earlier in the year. He is much missed and our thanks go to him for the valuable assistance he has given over many years.

On retiring as Librarian in 1981 Miss Scherr gave to the library two copies of 'A List of Library Procedures' which she had compiled to help future librarians. I wish to thank her for this and all her patience with me during this year. My thanks go also to Mrs Hollowell and Mr Nethercott for their generous assistance.

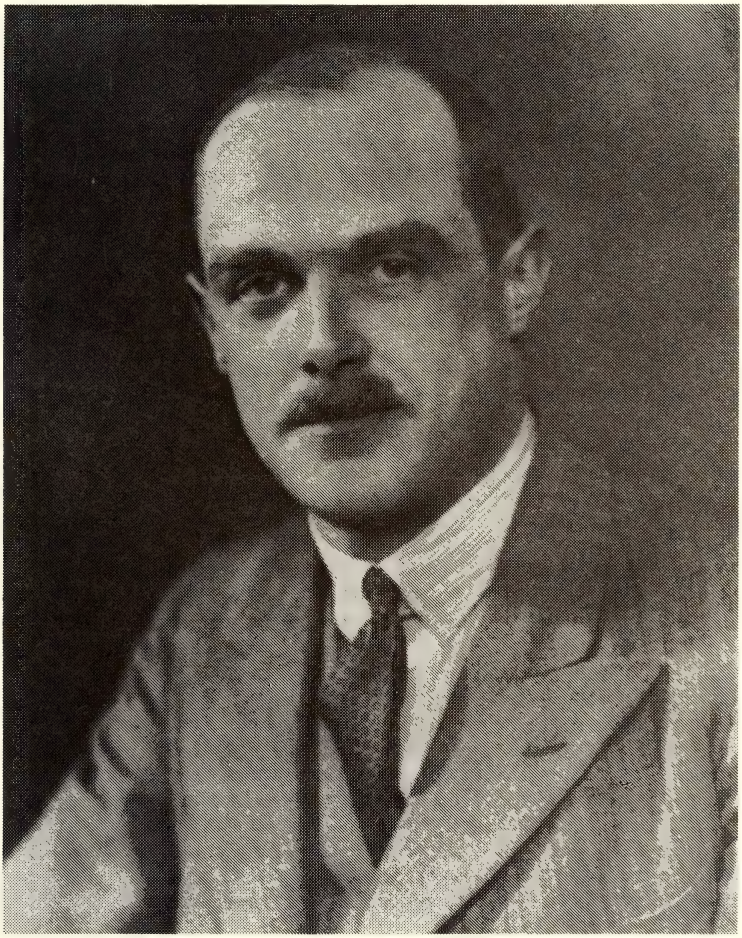
Structural alterations to the Museum Building have necessitated the temporary closure of the Library Room. The books and journals have been put into storage in the University of Bristol Law Library, until the Library Room is available later in the year. More than ever this year we must acknowledge our thanks to the Controller of the City Museum and Art Gallery and to the Librarian of the University of Bristol for providing accommodation, storage space and other help.

MARION GRAY, Hon. Librarian

OBITUARY : PROFESSOR FRANK COLES PHILLIPS

Emeritus Professor Frank Coles Phillips died on September 11, 1982 at the age of 80.

He was born in Pymouth and retained a great affection for the West Country throughout his life. In 1921 he went from Plymouth College to Corpus Christi in Cambridge and, having taken a First Class honours in geology and stayed to undertake research in Mineralogy, he was appointed a Fellow of Corpus in 1927 and a University Lecturer in 1932. After a period in 1946 in the Chair of Geology at the University of Liverpool, which he had to vacate because of ill-health, he came to Bristol in 1948 and was in turn Lecturer, Reader and Professor. He retired to Brockenhurst in 1967.



Professor F. Coles Phillips

OBITUARY

FCP, Coles or Phil (depending on how well you knew him) made significant contributions to geology in the fields of mineralogy, metamorphism, structural geology and, particularly, petrofabrics. He is perhaps best known for his textbooks *Introduction to Crystallography* (1947) and *The Use of Stereographic Projection in Structural Geology* (1954) which are models of clarity.

He was an outstanding teacher at all levels. His lectures were meticulously prepared and beautifully delivered - each point being made twice and sometimes thrice, if it was important. At the request of the British Council he undertook a lecture tour to Australia where his courses were enthusiastically received.

He was for over fifty years a member of the Geological Society of London, the Mineralogical Society, the Geologists Association, the Royal Geological Society of Cornwall who awarded him their Gold Medal, and was a founder member of the Ussher Society.

He became a member of the Bristol Naturalists' Society in 1949 and was an active member of the Geology Section - committee member, Vice-President and President in 1951-52. In the parent body he was Member of Council 1954-55, Vice-President 1958-59 and President 1960-61, his two presidential addresses being on 'Pattern and Symmetry in Nature'.

1962 was our Centenary Year and for this Coles Phillips wrote 'The First Hundred Years - a Centenary History of the Bristol Naturalists' Society' and with A.J. Willis wrote an account of the Centenary Celebrations.

His distinguished scientific achievements and wide knowledge of geology, which he was happy to share with students and colleagues alike, were only two of his accomplishments however. He was an engineer of no mean ability - a designer of equipment and maker of quite sophisticated apparatus on his own lathe. He had an extensive knowledge of German and dabbled effectively in Russian, Chinese and Italian. Wine-making, gemstones, model engineering, horology, railways were all hobbies in which his interests were deep and proficiency profound.

Well-founded rumour has it that the operation of painting his house - with at least five coats - was like that of the Forth Bridge.

In the wider life of the community he was a Church Warden in Brockenhurst and a Governor of King's School, Bruton.

Although the Southwest was his first love he had a great affection for the people and natural history of the Orkneys and Shetlands.

Phil was, above all, a gentleman - modest, wise, kindly, considerate, tolerant and caring. He is remembered with affection by generations of students and colleagues.

He is survived by his wife Seonee, whom he married in 1929, and two children, William and Joanna.

Proceedings of the Bristol Naturalists' Society (1982), **42**: 13-22.

PLAYA CYCLES IN THE MERCIA MUDSTONE (KEUPER MARL) OF AUST CLIFF, AVON

M.T. CURTIS

2 Ribblesdale, Thornbury, BS12 2DW

ABSTRACT

The evaporite-bearing Triassic rocks of Aust Cliff are described along with a river channel of similar age cut into the Carboniferous Limestone of Wickwar. The nature of the evaporites in the area north-east of Bristol is then discussed in the light of these exposures and it is concluded that the evaporites show a markedly concentric distribution with respect to upland areas and were formed on playa flats with the possibility of halite being derived from reworked Permian evaporites.

INTRODUCTION

The Mercia Mudstone (Keuper Marl) of the area north-east of Bristol comprises a sequence of dominantly red mudstones of variable thickness, lying unconformably on an irregular surface of Palaeozoic rocks. The mudstone was deposited in basins surrounded by uplands of Carboniferous and Devonian rocks. In the area under consideration, the dominant upland feature was the rim of the North Bristol Coalfield Syncline delineated by an arcuate ridge of Carboniferous Limestone and Devonian rocks running north from Chipping Sodbury to Cromhall and thence south-west to Almondsbury. Where the Mercia Mudstone abutted these uplands, scree deposits are found interdigitating and and merging laterally with the mudstones. The scree deposits comprise angular clasts of limestone and sandstone cemented by calcite. Post-depositional dolomitisation is common.

The evaporites contained within the Triassic rocks have not previously been studied in detail except for the economically important celestite deposits (Nickless *et al.*, 1975, 1976 and Wood & Shaw, 1976). Apart from the the commercial celestite pits, exposures of the evaporite-bearing rocks are very rare. Aust Cliff is the only extensive, accessible exposure comprising 30 m of dominantly red evaporite-bearing mudstones resting unconformably on a platform of Carboniferous Limestone. The geology of the cliff exposure has recently been reviewed by Hamilton (1977). The cliff lies 4 km west of the main exposure of the Carboniferous Limestone of the syncline.

The erosion surface on top of the Carboniferous Limestone exposed in the rim of the syncline, is cut in several places by channels. These channels, hitherto unrecorded, are generally inaccessible due to their location high in the faces of working quarries. One channel was exposed recently during working in a quarry near Wickwar. The channel emptied towards the centre of the syncline but in view of a number of features relevant to the description of sedimentation of the Mercia Mudstone, its inclusion here is felt to be justified.

AUST CLIFF - Grid Ref. ST 566898

A measured vertical section of the cliff is presented in Table 1. From the base of the cliff, the section was measured stepwise vertically utilising the scree slope above the bridge abutment. The Triassic sediments drape

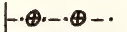
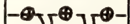
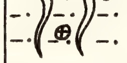
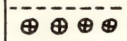
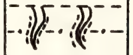
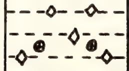
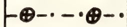
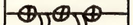
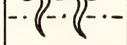
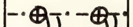
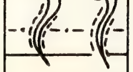
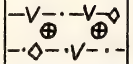
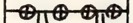
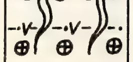
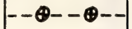
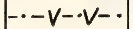
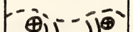
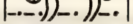
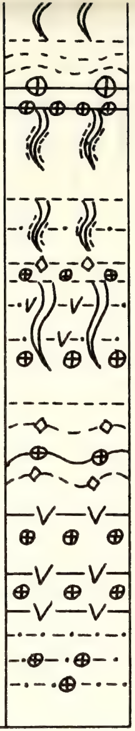
Bed No.	Thickness (mm)	Description of Lithology	Description of Bedding	Description of Gypsum	Legend
		9 metres of barren massive red Keuper Marl, occasional bands of massive green marl			
33	1430	Red siltstone	Massive	Occasional nodules	
32	120	Green siltstone	Massive	Nodular	
31	2000	Red siltstone	Massive	Occasional nodules and vertical stringers to 20mm starting at bed no. 32	
30	100	Gypsum		Nodular bed with green marl band above and below	
29	350	Red siltstone	Massive	Vertical stringers starting at bed no. 30. Green marl on margins	
28	50	Green siltstone	Laminated with salt 'pseudomorphs' on underside of laminae	Nodules	
27	370	Red siltstone	Massive	Nodules	
26	100	Gypsum		Nodular bed	
25	150	Red siltstone	Massive	70mm wide vertical veins starting at bed no. 26	
24	100	Red siltstone and gypsum	Massive	Impersistant nodular bed	
23	2760	Red siltstone	Massive	Many vertical veins to 70mm thick all starting at bed no. 24. Many with green marl margins. Also horizontal bands to 30mm	
22	870	Red siltstone with green variegations	Massive to laminated with 'pseudomorphs' on green laminae	Several horizontal nodular bands	
21	100	Gypsum		Nodular bed	
20	2000	Red siltstone with green variegations	Massive	Irregular nodules to 200mm with vertical stringers to 70mm wide starting at bed no. 21	
19	115	Green siltstone	Massive	Nodules to 40mm	
18	270	Red siltstone with green variegations	Massive		
17	50-150	Green siltstone	Undulating top surface	Nodules to 400mm	
16	330	Red siltstone	Massive	Vertical stringers to 50mm	

TABLE 1. Section immediately nor

				starting at bed no. 17
15	50	Green siltstone	Laminated with undulating bottom surface	
14	0-20	Gypsum		Skeletal with gypsum rock
13	140	Green siltstone	Massive	Bedded skeletal nodules
12	120	Red siltstone	Massive	Skeletal vertical stringers with green edges starting at bed no. 13
11	100	Green siltstone	Massive?	
10	160	Red siltstone	Massive	Vertical stringers with green edges starting at bed no. 11
9	125	Green siltstone	Laminated-pseudomorphs?	Nodules to 50mm
8	2530	Red siltstone with some green variegations	Massive	Vertical skeletal stringers starting at bed no. 9
7	3000	Red siltstone with green variegations	Massive	Many vertical and near vertical veins to 60mm with horizontal bands of skeletal nodules
6	300	Green siltstone	Undulating laminae flattening supratenuously upwards. Salt 'pseudomorphs' on underside of laminae	Bands of skeletal nodules to 30mm and gypsum rock
5	250	Red and green variegated siltstone	Massive with undulating erosional surface on top	Some evidence of dissolution of gypsum
4	170	Red siltstone with green variegations	Massive	Bedded skeletal nodules
3	220	Red siltstone	Massive	
2	140	Red siltstone	Massive	Nodules up to 150mm
1	1250	Red siltstone	Massive	Several barely discernible beds of skeletal nodules



Key:-

-·-· Red siltstone

---- Green siltstone

-V- Variegated siltstone

⊕ ⊕ Nodular gypsum

Gypsum rock

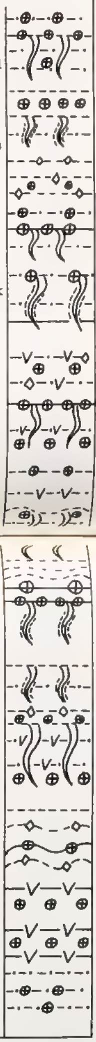
Vertical gypsum stringers

Laminated green siltstone with halite 'pseudomorphs'

bridge parapet, Aust Cliff.

TABLE 1. Section immediately north of bridge Parapet, Aust Cliff.

Bed No.	Thickness (mm)	Description of Lithology	Description of Bedding	Description of Gypsum	Legend
9 metres of barren massive red Keuper Marl, occasional bands of massive green marl					
33	1430	Red siltstone	Massive	Occasional nodules	
32	120	Green siltstone	Massive	Nodular	
31	2000	Red siltstone	Massive	Occasional nodules and vertical stringers to 20mm starting at bed no. 32	
30	100	Gypsum		Nodular bed with green marl band above and below	
29	350	Red siltstone	Massive	Vertical stringers starting at bed no. 30. Green marl on margins	
28	50	Green siltstone	Laminated with salt 'pseudomorphs' on underside of laminae	Nodules	
27	370	Red siltstone	Massive	Nodules	
26	100	Gypsum		Nodular bed	
25	150	Red siltstone	Massive	70mm wide vertical veins starting at bed no. 26	
24	100	Red siltstone and gypsum	Massive	Impersistant nodular bed	
23	2760	Red siltstone	Massive	Many vertical veins to 70mm thick all starting at bed no. 24. Many with green marl margins. Also horizontal bands to 30mm	
22	870	Red siltstone with green variegations	Massive to laminated with 'pseudomorphs' on green laminae	Several horizontal nodular bands	
21	100	Gypsum		Nodular bed	
20	2000	Red siltstone with green variegations	Massive	Irregular nodules to 200mm with vertical stringers to 70mm wide starting at bed no. 21	
19	115	Green siltstone	Massive	Nodules to 40mm	
18	270	Red siltstone with green variegations	Massive		
17	50–150	Green siltstone	Undulating top surface	Nodules to 400mm	
16	330	Red siltstone	Massive	Vertical stringers to 50mm starting at bed no. 17	
15	50	Green siltstone	Laminated with undulating bottom surface		
14	0–20	Gypsum		Skeletal with gypsum rock	
13	140	Green siltstone	Massive	Bedded skeletal nodules	
12	120	Red siltstone	Massive	Skeletal vertical stringers with green edges starting at bed no. 13	
11	100	Green siltstone	Massive?		
10	160	Red siltstone	Massive	Vertical stringers with green edges starting at bed no. 11	
9	125	Green siltstone	Laminated-pseudomorphs?	Nodules to 50mm	
8	2530	Red siltstone with some green variegations	Massive	Vertical skeletal stringers starting at bed no. 9	
7	3000	Red siltstone with green variegations	Massive	Many vertical and near vertical veins to 60mm with horizontal bands of skeletal nodules	
6	300	Green siltstone	Undulating laminae flattening supratenuously upwards. Salt 'pseudomorphs' on underside of laminae	Bands of skeletal nodules to 30mm and gypsum rock	
5	250	Red and green variegated siltstone	Massive with undulating erosional surface on top	Some evidence of dissolution of gypsum	
4	170	Red siltstone with green variegations	Massive	Bedded skeletal nodules	
3	220	Red siltstone	Massive		
2	140	Red siltstone	Massive	Nodules up to 150mm	
1	1250	Red siltstone	Massive	Several barely discernible beds of skeletal nodules	



Key:-

-·-·	Red siltstone
----	Green siltstone
—V—	Variegated siltstone
⊕ ⊕	Nodular gypsum
▭	Gypsum rock
)))	Vertical gypsum stringers
-◇-	Laminated green siltstone with halite 'pseudomorphs'

over a flat-topped ridge in the Carboniferous Limestone causing an anticlinal structure. The flanks are offset by a series of faults, so the greatest thickness of evaporites is exposed immediately north-east of the abutment. In the section, the occurrence of the fibrous form of gypsum, satin spar, has been ignored, since this represents a late remobilisation (Shearman *et al.,* 1972). This is the only gypsum in the section not calcitised due to its late stage segregation from the main evaporites by preferential solution. Only the bottom 20 m of the cliff were logged in detail since the upper portion contains no evaporites and consists only of blocky red mudstone with occasional featureless green bands.

MERCIA MUDSTONE SEDIMENTS AT AUST CLIFF

The sediments of the cliff consist dominantly of massive, red, dolomitic, silty mudstone. The mudstone is however interrupted by several changes in sedimentation throughout the sequence. Such a change is typified by the example between beds 5 and 6 in Table 1. This has an undulating surface and is immediately overlain by buff/green and red variegated sediments where the proportion of red colouration increases downwards. Similar variegation is also seen underlying a continuous bed of nodular gypsum (bed 20, Table 1). Bed 6 overlying the undulating surface, comprises alternating laminae of green silt and clay with individual laminae measuring up to 15mm. The lowermost laminae rest in depressions in the undulating surface and lens out laterally whilst those above reflect the shape of the surface with the undulations dying out supratenuously vertically. Occasionally, the laminated green mudstone immediately overlies continuous beds of nodular gypsum. Frequently, lamination is destroyed laterally leaving apparently structureless green mudstone.

The green mudstone has a very vivid colour when fresh but samples stored over a period of years have progressively changed to a dull blue/grey colour. This colour change is hitherto unrecorded.

Whilst the red mudstone at Aust is devoid of sedimentary structures, the laminated material shows them in abundance. These structures are not easily seen *in situ* due to their being obscured by green clay adhering tenaciously to their surfaces combined with a lack of any colour differentiation between the laminae. They may however be found in abundance in weathered beach shingle. The most common structures are 'salt pseudomorphs'. These are not pseudomorphs in the mineralogical sense but casts produced by sediment filling the void left when pre-existing halite cubes were dissolved. Almost all are found on the base of silt laminae which immediately overlie clay.

Ripple marks are also fairly abundant with sinuous and straight-crested symmetrical forms being the most abundant. Typically, this type has wavelengths of 30 to 40 mm and amplitudes of 3 to 5 mm. Some asymmetric examples may be found with wavelengths and amplitudes similar to those of the symmetrical forms. In nearly all cases the ripple marked laminae have 'salt pseudomorphs' on their underside. In addition, some slabs show primary current lineation on their upper surface often with 'pseudomorphs' on their underside. Further, many of the plain-bedded slabs show mica flakes on their surfaces which produces a marked fissility.

EVAPORITES AT AUST CLIFF

The gypsum is observed in three different settings. The first and by far the most common is the bedded, nodular gypsum extensively distributed through the bottom portion of the cliff. The nodules mainly occur in the massive red mudstone but commonly have a halo of green mudstone around them up to 20 mm thick. Typically, the nodules range from 150 to 200 mm in diameter but are occasionally so densely packed as to form a continuous bed.

The nodules comprise aggregates of smaller ovate nodules 50 to 75 mm in diameter separated by displaced stringers of mudstone and thin sections show them to consist of secondary alabastrine gypsum with some porphyroblastic development. Celestite is present within the alabastrine gypsum as small corroded laths. Calcite occurs commonly as euhedral to subhedral crystals 2 to 3 mm long replacing the gypsum particularly at the edges of the nodules. These scalenohedral crystals contain rare corroded laths of celestite. In the lower part of the cliff where dissolution of gypsum has been extensive, 'skeletal nodules' developed consisting only of the calcite remaining after the removal of the gypsum. In some cases, the calcite comprises up to 90% of the nodule.

The second setting for the gypsum is in tabular, subvertical stringers which taper downwards from thicknesses up to 70 mm. These stringers are polygonally disposed and always originate downwards from surfaces marking changes in sedimentation, of either laminated green mudstone or densely packed beds of nodular gypsum as described above. The gypsum in these stringers is the same as that described in the nodules. Dissolution of the gypsum in the lower part of the cliff has resulted in 'skeletal stringers' in the same way as dissolution from the nodules. Most of the vertical stringers are surrounded by a halo of green mudstone up to 20 mm thick, similar to the nodules.

The third type of gypsum is in the laminated units as nodules and beds of nodules up to 30 cm in diameter. In some cases the gypsum has cemented the host sediment producing a gypsum rock. Rarely in these laminae, examples are found where gypsum or its skeletal remains occupy the depressions between symmetrical ripple marks.

Celestite is a common accessory mineral both microscopically as corroded laths associated with the alabastrine nodular gypsum and as rare laths associated with the secondary calcite, and macroscopically as platy crystals of celestite up to 20 mm replacing nodular gypsum and enclosing euhedral calcite crystals. In a vertical stringer exposed high in the cliff immediately beneath the bridge, gypsum and its associated satin spar are completely replaced by blue celestite. The satin spar retains its original structure whilst the stringer is replaced by the typical vuggy celestite commonly found in the commercial celestite deposits in the Coal Measure shales of the Yate area, i.e. small subhedral crystals adjacent to the wall-rock graduating to large euhedral crystals in the centre. This vein cannot be observed for more than 500 mm and its relationship to the sediments and other minerals is not determinable but its structure is very similar to that observed in the vertical stringers observed above.

In addition to the section above which represented the greatest continuous thickness of evaporites exposed in the cliff, laminated green sediments showing all the features described above along with bedded nodular gypsum may be periodically observed in the beach beneath the cliff.

CHURCHWOOD QUARRY, WICKWAR - Grid Ref. ST 713900

A channel cut into the erosion surface overlying the Carboniferous

Limestone has recently been exposed in the western face of the quarry. The channel base has a crescentic cross section reaching 8 m below the general level of the erosion surface and is 90 mm wide. This channel is filled with a series of smaller cut-and-fill channels rarely more than 2 m deep. All have an erosional base overlain by coarse conglomerates up to 200 mm in thickness with sandy to muddy matrices which pass upwards into sands, silty sands and finally, clays. The highly angular clasts in the conglomerate show imbrication and are usually matrix supported. The colour of the finer constituents of these deposits frequently changes from brown/red to green with decreasing grain size. The green colour of the deposit was much more pronounced in fresh specimens and noticeably dulled with time.

Dumped material from the channel contains a number of sedimentary features not usually found *in situ*. Large polygonal suncracks are common on bedding planes in the finer red and green sediments but the infill material is invariably green. Salt 'pseudomorphs' up to 12 mm are also a common feature on bedding planes. They are not so well preserved as those from Aust Cliff since the buff sediments in which they were formed here are sandier.

DISCUSSION

The large channel cut into the surface of the Carboniferous Limestone of Churchwood Quarry is filled with a sequence of smaller channels superimposed on each other. Each of the smaller channels has a strongly erosional base which is often overlain by a matrix-supported conglomerate which indicates a mudflow deposit. This in turn is overlain by a fining-upward succession of sands and silts finally topped by a desiccation surface with mudcracks and halite 'pseudomorphs'. This type of deposit is strongly suggestive of an arid climate broken only by short-lived seasonal rains where initial, chaotic, unsorted mudflows are overlain by progressively finer sediments deposited as the current energy dropped. Finally, the desiccation surface at the top suggests a return to hot, dry weather. These sediments represent the filling of a wadi-type valley through which sediment passed from the uplands to the east into a basin of sedimentation.

The halite found on the desiccation surfaces is unusual in that it is not associated with gypsum. It is suggested that the halite was dissolved in the surface water flowing through the wadi and was therefore derived from the uplands. Brunstrom and Kent (1967) suggested that the imbalance between the relative quantities of gypsum and halite in the Trias could be explained by the introduction of halite from Permian diapirs breaking through the Triassic surface. This view was prompted by the observation of such structures in North Sea sediments affecting beds as old as Middle Triassic age. If this is the case, then Permian deposits may have lain on the uplands to the east of this river section which were being eroded and supplying halite to the Triassic basin of sedimentation through meteoric water run-off. There is however, no evidence at present for the former existence of these Permian deposits in the area under consideration.

The sediments of Aust Cliff show a marked cyclicity, an example of which is shown in Figure 1. The undulating erosion surface is not often seen since phases of prolonged erosion have caused the superimposition of cycles as in bed 21 where the erosion surface coincided with a bed of nodular gypsum.

This type of surface is found in exposed playa flats and results from volume increase in the sediments caused by interstitial growth of evaporites from groundwater near the playa surface (Kendall, 1978). The vertical accretion of sediment results from windblown dust adhering to the surface dampened by a high water table, dew or surface run-off. The overlying laminated silt and clay units are interpreted as arising from sheetwash resulting from storms. The halite 'pseudomorphs' represent a non-accumulative evaporite deposited in the finest sediment as a halite crust upon desiccation following a flooding phase. The reworking of ephemeral salts is known to disrupt the lamination on playa surfaces (Kendall, 1978) and probably explains the impersistence of lamination in some of the green mudstone units. The succeeding flood dissolved the halite and carried it towards the basin centre and deposited fresh, coarser sediment in the resulting mould. The low amplitude of both the symmetrical and assymmetrical ripples and the evaporites in the ripple troughs suggest extreme shallowing of the flood waters (Pettijohn, 1975, p. 110). Following each phase of flooding, an abrupt return to the blocky red sediments shows continued deposition of wind-borne sediment on the damp surface. These deposits suggest a climatic regime of extreme aridity followed by short periods of rainfall.

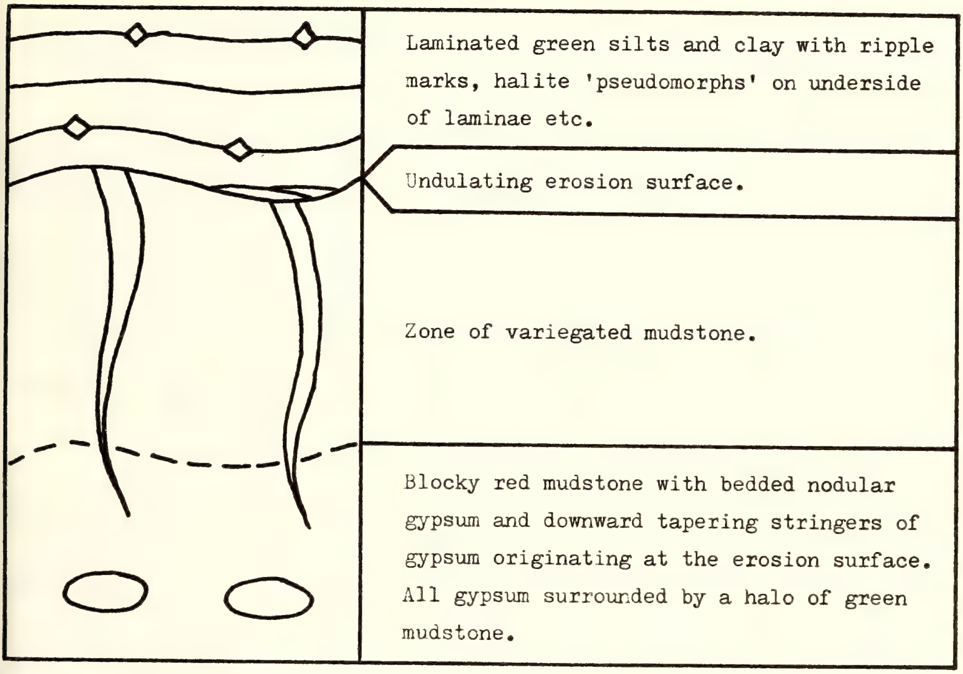

Laminated green silts and clay with ripple marks, halite 'pseudomorphs' on underside of laminae etc.
Undulating erosion surface.
Zone of variegated mudstone.
Blocky red mudstone with bedded nodular gypsum and downward tapering stringers of gypsum originating at the erosion surface. All gypsum surrounded by a halo of green mudstone.

FIGURE 1. Idealised cycle of sedimentation at Aust Cliff.

The bedded nodular gypsum is typical of that having formed originally by precipitation from hypersaline groundwaters by displacement of the host sediment in exposed playa flats (Kendall, 1978). The anhydrite found within the gypsum could be primary or early diagenetic after a gypsum precursor. It may also have resulted from deep burial of the sediments (900 to 1200 m) in which they are now contained (Mossop & Shearman, 1973). Other authors have however found anhydrite relics in evaporites replaced by celestite

(Nickless *et al.*, 1975; Wood & Shaw, 1976) and quartz (Tucker, 1976) during relatively early diagenesis suggesting strongly that the original mineral may have been anhydrite.

The calcitisation of this deposit may have occurred at any time prior to its rise from deep burial above the point of the anhydrite to gypsum transition (Mossop & Shearman, 1973) since the satin spar formed by hydraulic fracture after or during this stage (Shearman *et al.*, 1972) has not been calcitised. The excess volume of calcium sulphate resulting from the hydration of the anhydrite was preferentially dissolved leaving the calcite unaltered. The secondary nature of this calcitisation is indicated by the decrease in calcite content away from the sediment-gypsum interface.

The celestite laths found within the alabastrine gypsum may either be primary having been deposited from the initial groundwater or secondary from the hydration of anhydrite to gypsum at either of the stages mentioned above since anhydrite is capable of holding more strontium in its crystal lattice than gypsum (Holliday, 1970). Holliday pointed out however that celestite is not common in ancient anhydrite rock and was rather to be regarded as late in origin. In the case of these deposits however, primary celestite has been reported (Wood & Shaw, 1976) indicating that strontium was a relatively abundant component of the groundwater.

The comments above also apply to the celestite found in the secondary calcite representing the residue formed when the evaporite nodule was replaced by calcite. Celestite is commonly found as the residue from or associated with replacements of earlier evaporites (West, 1973).

The celestite found replacing the vein in the upper part of Aust Cliff represents a very late stage replacement since the associated satin spar is also replaced. As discussed above, the satin spar was formed during the emergence from deep burial. The celestinisation however occurred during the relatively recent geological past possibly resulting from hydrothermal remobilisation of existing celestite (Curtis, 1982). The platy celestite found replacing calcitised, nodular gypsum at Aust Cliff was probably related to this stage of activity.

Colour distribution in these sediments shows a marked regularity. Green colouration is usually to be found associated with areas of high salinity, notably around gypsum nodules, around evaporite-filled mudcracks and throughout the laminated sediments showing abundant evidence of having been deposited in an environment of progressive desiccation. The previously unreported change in colour of the green sediments from green to blue/grey strongly suggests that the colouring pigment comprises a mixed valent iron compound with the colour change reflecting the oxidation on exposure of some of the ferrous iron. A similar colour change is observed when a mineral such as vivianite, a simple mixed-valence iron compound, is oxidised.

Walker and Honea (1969) have shown that the haematite responsible for the colouration of red beds is formed by the *in situ* oxidation of fine grained iron-bearing clay minerals deposited in desert basins. They believe the haematite to be formed during or subsequent to deposition dependent on the conditions of Eh and pH prevailing within the sediment. It is believed that the red colouration may have formed in the Mercia Mudstone contemporaneously with deposition whilst the playa surface was exposed to the highly oxidising environment of an arid climate. Seasonal flooding led to the inundation by saline, less oxidising waters resulting in deposition of laminated deposits containing a higher proportion of ferrous iron. The zone of massive variegated sediment found beneath the erosion surfaces overlain by laminated units suggests that brines percolaring down from the sheetwash provided an environment sufficiently reducing to alter the colour of the existing massive red mudstone. These observations lend support to the view that the colouration of the Tea Green Marl overlying these deposits results from the alteration of red mudstone by marine waters percolating downwards during the Rhaetic transgression.

A crude cyclicity of these sediments was discussed by Whittard (1949) who interpreted the vertical tapering stringers of gypsum as filled desiccation cracks which are polygonal in plan. This study supports this view since the top of these stringers always coincides with an erosion surface. The gypsum within these cracks is identical to that in the bedded nodules suggesting that it was deposited at the same time. The subsequent calcitisation has also been similar in both cases. No reference to a modern or ancient analogue to these very large examples can be found however.

Arthurton (1980) described cyclic sedimentation within the saliferous Mercia Mudstone of the Cheshire saltfield. The sediments of these deposits agree well with those from Aust Cliff except that the bedded halite and laminates within the blocky red units were preserved in the former. Arthurton concluded however that these deposits formed in an environment very similar to that proposed for the evaporites north-east of Bristol with the exception that marine flooding was invoked to explain the presence of halite.

It has been postulated that the area north-east of Bristol formed a stable block bounded to the east and west by major grabens (Whittaker, 1975) in which major halite bodies accumulated during the Triassic period. The topography was very similar to that being exhumed today in which the Devonian and Carboniferous rocks form uplands from which was derived the detritus deposited in the Triassic basins. A concentrically arranged suite of evaporites can be defined with respect to these uplands. Celestite is the commonest evaporite within the Mercia Mudstone adjacent to the Palaeozoic inliers (Nickless *et al.*, 1976) whereas gypsum, interstitial dolomite and halite 'pseudomorphs' dominate the thicker sediments of the playa flats away from them and finally thick halite bodies occur in the centres of the main fault-controlled basins notably in Somerset and Cheshire. Such a concentricity agrees well with the postulated model of a complex of playa lakes supplied by internal drainage.

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THE IMPACT OF COPPICING ON A WOODLAND ENVIRONMENT

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ABSTRACT

The resumption of annual coppicing at the Wetmoor Nature Reserve, Avon, has brought change to the habitat structure of this ancient woodland. Assessments of hazel biomass, productivity and regrowth characteristics are given and coppicing effects on the ground flora cover, light intensity, temperature and soils are described. It is concluded that 12 years of coppicing has introduced significant habitat diversity in otherwise uniform abandoned coppice.

INTRODUCTION

The ancient woodland practice of coppicing, where the shrub layer was periodically cut back to ground level, largely died out before 1914. Coppicing formed an integral part of the traditional agricultural economy possibly as far back as Neolithic times (Peterken, 1981). A regular supply of small wood from hazel coppice was long used for wattle in house building, hurdles and baskets as well as providing a renewable resource for firewood. Most of these outlets for coppice wood have disappeared; coppice management, preparation and extraction proving too labour intensive and largely uneconomic. By 1965/67, a Forestry Commission census revealed that out of 9,800 ha. of oak standards over coppice in Britain, only 160 ha. was actively worked as coppice.

Abandoned coppice, often associated with ancient woodland, loses much of its value for wildlife and recreation, the bird life preferring the bushy stage of coppice regrowth; butterflies, moths and many woodland insects avoid the heavily shaded coppice areas while plant life diversifies only when the coppice is opened up. Interest in the re-establishment of regular coppicing has arisen in recent years, sometimes for commercial working, often as an important part of woodland management for nature conservation. There the object of coppice restoration is to provide wildlife with the varied woodland habitats prevailing in previous centuries.

In 1970, regular annual coppicing was resumed at the Wetmoot Reserve, Lower Woods, near Wickwar, Avon after a gap of about 60 years. This damp oak woodland, described in the 1086 Domesday Survey, has an extensive understorey managed, in the 19th century, on a 16-year coppice cycle. A similar cycle has been imposed in the Reserve together with suitable control no-touch areas. The Reserve wildlife, after the resumption of coppicing, has been described (Hendry, 1980) with a full description of the Reserve location.

The aim of the present study is to describe the effects of coppice management after 12 years on the hazel understorey, on coppice productivity and regrowth and to outline the effects of coppicing on the physical environment of the Reserve.

METHODS AND SITE DESCRIPTION

The survey was conducted between July and September 1982. Ten coupes were examined representing the annual winter coppicing from 1981/82 (coupe 1 with one season of regrowth) to 1970/71 (coupe 12 with 12 seasons of regrowth). An area of abandoned coppice adjoining coupes 3 and 4 was chosen to provide comparative data. An open ride, 7-8 m wide, bisects the area (see Figure 1). The surface gleyed clay soils of the Denchworth series have a pH range of 5.0 t0 5.6 and have been fully described (Hendry, 1980) with the site climate, geology, flora and fauna.

BIOMASS ASSESSMENT

Within each coupe, the number of stems on every hazel stool was counted and recorded in metre height classes, i.e. all stems between 2.50m and 3.49m were placed in the 3m height class. In coupe 1 (coppiced in 1981/82) exceptionally the stems were graded into 50cm, 70cm and 1m height classes. The 1m height class alone showed two distinct growth forms, branched and unbranched, which were separately assessed. Recording was also made in an adjoining area of coppice abandoned in about 1912. Representative stems from each class were removed at base level, the leaves stripped and stored. Fresh weights of the separated leaf and stem fractions were obtained prior to oven drying to constant weight at 105°C. Destructive sampling of stool base and roots was not conducted, no attempt was made to monitor below-ground productivity, dead wood nor leaf matter. From the dry weights for each height class an estimate of the biomass above ground was made for each of the annual coupes. Exceptionally coupes 9 and 11 (1973/74 and 1971/72) were excluded from the survey as they lay outside the immediate major areas of coppicing.

Estimates of ground cover were obtained using 1m^2 quadrats at equal intervals along transects across each coupe from which ground vegetation samples were clipped and dried to provide information on ground flora production. Sample oak-standard dimensions were also recorded throughout the area.

ENVIRONMENT ASSESSMENT

Coupes with hazel in the 3rd, 6th and 10th years of regrowth (929 to 1098 stools/ha.) were selected for detailed assessment together with an adjoining area of abandoned coppice (1165 stools/ha.) and a stool-free area of open ride.

Solar radiation at ground level was measured with a solarimeter under conditions of diffuse light intensity to eliminate sun-fleck effects (Geiger, 1961). Duplicated readings were taken on the same day at 10.30 and 13.00h. at regular intervals along transects, each coupe determination being compared with values from the adjoining ride. Light intensities in the ride were influenced by the oak-standard canopy but were free of direct hazel shading and therefore reproduce the light regime immediately after coppicing.

Temperature and humidity data were obtained using an Assman Psychrometer at ground level and at a height of 1.2m at regular intervals along transects. The readings were taken at both heights and to eliminate varia-

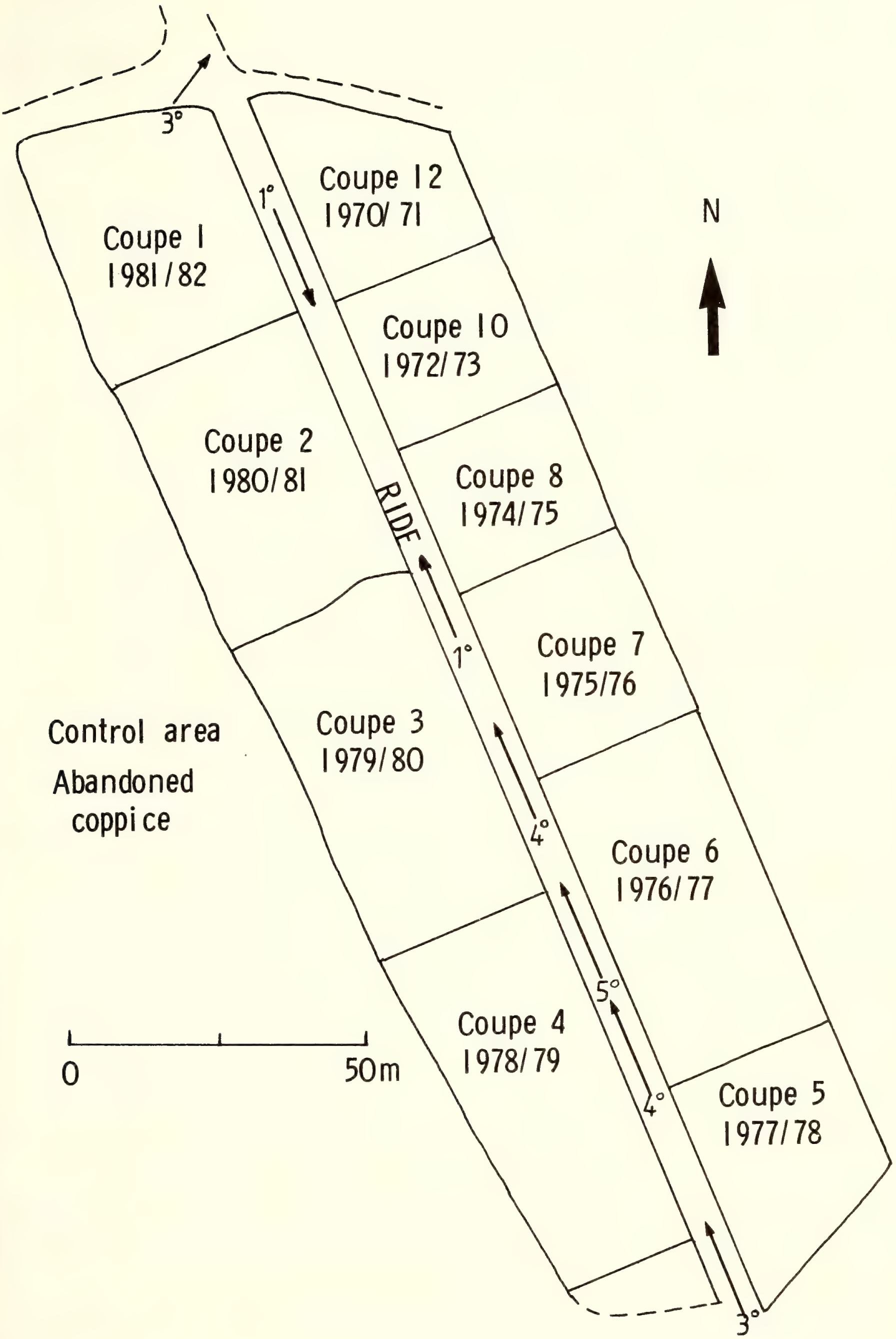
3°
Coupe 1
1981/82
1°
Coupe 12
1970/71
N
Coupe 10
1972/73
Coupe 2
1980/81
RIDE
Coupe 8
1974/75
1°
Coupe 7
1975/76
Control area
Abandoned
coppice
Coupe 3
1979/80
4°
Coupe 6
1976/77
5°
Coupe 4
1978/79
0
50m
4°
Coupe 5
1977/78
3°

FIGURE 1. Plan of coupes at Wetmoor Nature Reserve, Avon.

tions with time, values were recorded continuously over the five sites.

Soil moisture distribution for each of the five areas was established using a bulk density corer. Core samples in triplicate were taken at depths down to 30cm before oven drying.

RESULTS

HAZEL COUPE STRUCTURE

Despite probable overall uniformity in woodland management over the centuries, considerable variation exists within the coupes (Table 1).

Coupe (= seasons regrowth)	Coupe structure		Hazel biomass		
	Standards/ha.	Hazel stools/ha.	kg/ha.	g/stool	g/stem
1	219	658	37.5	57.0	3.6
2	201	615	153.2	249.1	19.4
3	317	1027	227.9	221.9	34.0
4	315	885	313.7	367.2	74.1
5	316	672	550.6	819.9	162.6
6	340	929	1426.0	1535.2	283.7
7	286	828	2072.1	2501.4	459.2
8	255	1098	2232.1	2032.9	497.9
10	332	1098	2772.4	2524.2	541.3
12	340	1384	4285.7	3095.6	731.7

TABLE 1 Hazel coupe structure and above-ground biomass.

Stocking densities of the standards, largely oak, varied from 201 per ha. to 340, mean 243 per ha., most standards having an age range of 85 to 120 years. Variations in the dimensions of the oak standards were not great, the mean height being 21.1m (standard deviation ± 1.94) and a diameter at breast height 0.38m (± 0.06).

Within the coupes studied, the hazel stool numbers varied from 615 to 1384 per ha., mean 916 per ha. No obvious topographical nor soil differences explain this variation; nor were stool density variations related to standard stocking densities. The variations illustrate the fact that local differences exist within otherwise superficially uniform woodland structures.

Following regrowth after coppicing, there is a sharp decline in the number of surviving hazel stems on each stool from 16 and 13 stems per stool in the first two seasons of growth to stabilise at between 4 and 5 stems per stool after 4 years. Within the 70 year-old abandoned coppice, 5 stems per stool was still the average number although in many cases one stem alone had assumed dominant and tree-like proportions. From these results it appears that stem die-back occurs after the first two years. However it should be noted that the relatively low standard density in the two youngest coupes (1 and 2) may also have influenced stem numbers. Variation in coppicing techniques is unlikely to have influenced stem numbers, since the coupes have been felled by conservation volunteers trained annually by the same instructors since 1973.

BIOMASS DETERMINATION

From the results of destructive sampling there appears to be an exponential increase in the plot of dry weights of stems against their respective heights. This relationship reflects the fact that growth (increase in mass) is not confined to elongation of the stem. Biomass additions from branch growth and particularly from radial increment become progressively greater as the shoots become older. The plot of leaf biomass however shows a less pronounced increase, in part due to the suppression of leaf growth on the lower branches of the tallest shoots.

The percentage water content of the hazel decreases with shoot height. The decline in leaf water content from 76% in leaves from young 0.5m shoots to 58% in 5m shoots may reflect changes in leaf morphology, leaves from the most recent coupes tend to be longer and softer than those from older growths. The woody stem water content also decreased with height from 60% at 0.5m to 45% or less in the tallest material.

The results from stool and stem density, stem height and destructive sampling provide estimates of hazel above-ground biomass. Biomass estimates for each coupe, adjusted for area were expressed in kg. per ha. (see Table 1). It is immediately clear that there is an increase in hazel biomass with each additional season of regrowth, but that the rate of increase fluctuates yearly probably reflecting in part the inherent and complex variations in climatic conditions over the 12 years. These variations in biomass production occur despite apparent standardised woodland management practices.

Biomass expressed as kg/ha. makes no allowance for stool stocking density nor variation in stem numbers. The results, when expressed as g. per stool show that coupes 3 and 8 appear to have lost biomass when compared with the biomass of shoots a season younger. In coupe 3, the decline in the number of shoots per stool, to 7 from the 13 of the previous year is a clear indication of actual loss of biomass. The reasons are not known. Loss of stool biomass in coupe 8 had been observed for several years. Some 15% of the stools in this coupe had a maximum of two stems and comparatively stunted growth. The unusually dry summer of 1975 and drought of 1976 coincide with the first and second growing season of this coupe and may explain the relatively poor growth development.

Calculation of the mean biomass per stem rather than per stool removes the factor of differing stool sizes. The results (Figure 2) show clearly the exponential increase in biomass with age as well as the slowing down in productivity after 8 to 10 years. The most rapid phase of productivity occurs during the fourth, fifth and sixth seasons after coppicing. This phase, characterised by increasing shading coincides with decreases in the mid-summer ground flora cover (see below).

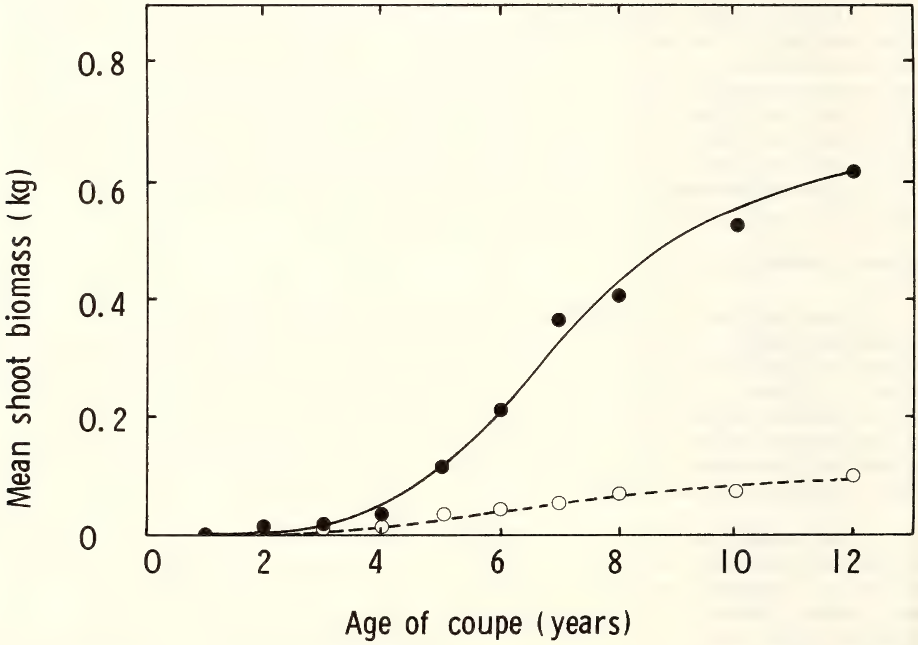

FIGURE 2. Changes in hazel coppice above-ground biomass, with or stem time, for stem (●) and leaf (○) fractions.

GROUND COVER

Figure 3 shows the extent of the ground flora within the coupes, expressed as a percentage of the total ground cover. A rapid increase in ground cover occurs during the first four years after coppicing, consistent with colonisation and rapid growth during the seasons of highest available light intensity. But with the development of the maturing hazel shoots and increase in shading (see below), there is a steady decrease in ground cover after the fourth season to about 40% after 10 to 12 years. Ground cover in the abandoned coppice was also about 40%. At the time of sampling, in mid-summer, *Rubus* spp. (brambles), being perennial, were the dominant ground vegetation species. It should be noted however that these observations take no separate account of the characteristic flush of spring flowers usually also associated with the second to fourth years of coppice regrowth.

Estimates from clipped quadrats of the ground vegetation biomass show maxima of 120 kg/ha. in coupe 3 declining to 22 kg/ha. after 12 years of regrowth (Figure 3). Again, these estimates take no account of any spring growth which has since died back. The productivity, largely of bramble, during the second, third and fourth years of coppicing will, presumably, have an impact on woodland moth and butterfly populations which rely on brambles as food plants. Such data, precisely linked to coupe age, are not presently available in the Reserve.

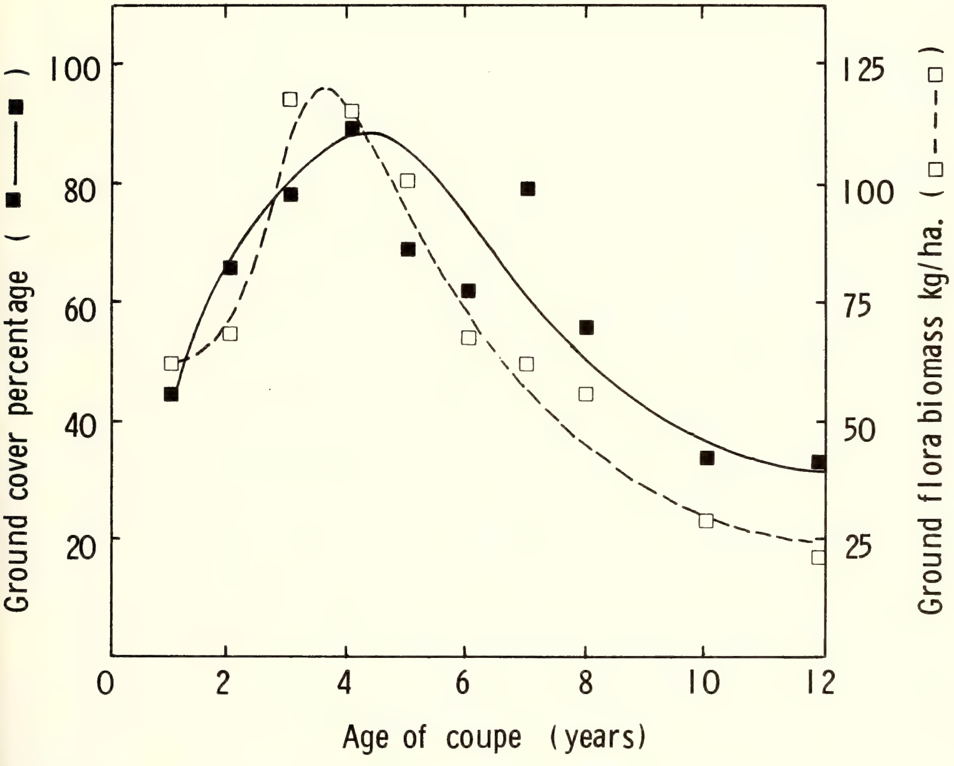

FIGURE 3. Ground vegetation as percent cover (■) and biomass (□) in coupes of differing ages.

ENVIRONMENTAL CHANGES

The practice of regular coppicing can be expected to have effects on the physical environment. This is most readily seen in changes in light intensity from the well-lit open aspect of newly cut coupes to the deep shade of the maturing coppice. The solarimeter results (Figure 4) show the rapid decrease in ground-level light intensity during the years of hazel regrowth. Based as a percentage of light in the rides (representative of newly cleared coupes) hazel regeneration reduces the light intensity to 78%

after 3 years, 58% after 6 and 33% after 10. Thereafter the heavy shading does not appear to alter, the 70 year-old abandoned coppice receiving 28% of the light available to the ride. The converse effect of clearing abandoned coppice is to immediately increase light intensities four-fold. The effects on the ground flora are noted above.

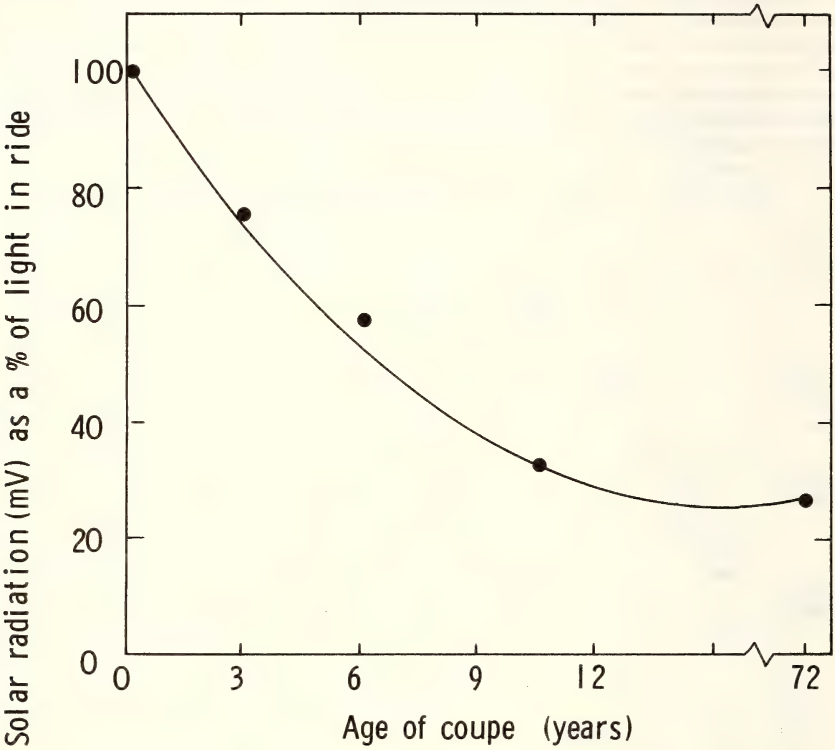

FIGURE 4. Changes in light intensity at ground level in coupes of different ages expressed as a percentage of light in open rides.

Coppice regrowth also appears to affect air temperature. Again compared to the cleared ride with a ground-level mean temperature of 21.2°C, there was a statistically significant decrease in temperature in the maturing coupes. There was a decline of 1.65°C at ground level and 0.90°C at 1.2m between the 10 year-old coupe and the adjoining open ride, differences which broadly persist into the abandoned coupes. Reduced light intensity, particularly of direct sunlight and a reduction in air motion are likely to contribute to these temperature falls. Conversely, an early effect of restoring a coppice cycle would be to cause a small but significant increase in the ground-level air temperature at least under the fairly typical mid-summer climatic conditions experienced during the survey.

Soil moisture content decreases significantly with depth in all the survey areas and reflects in part the pronounced surface-draining nature of the soils. Salisbury (1924) stated that the permanent water table in uncut coppice would be lower than in actively worked coppice, the practice of coppicing resulting in a rise in the water table. This effect was not detected during the survey, the small differences in soil moisture content between the coupes were not statistically significant. There is then no evidence that coppicing on these soils has any marked effect on soil moisture content, at least to a depth of 30cm.

Bulk densities of the soil increase with depth throughout the surveyed areas suggesting that this is an inherent feature of the soils and not related to coppice regrowth. The small density differences between coupes are not statistically significant. No evidence was found of surface soil compaction neither in the rides nor in coupes subject to recent trampling, features which have arisen in other studies (Rackham, 1967).

CONCLUSIONS

Accurate assessment of coppice biomass involves detailed recording of the varied and complex form of hazel regrowth. Correlation of shoot biomass with shoot height has an important but restricted value. As shoot height increases dry weight increases in an exponential manner. The taller the shoot, the less well defined is the relationship between height and biomass. The methods described here for assessing hazel productivity are probably most suited to relatively young coppice which is actively accumulating biomass. The relationship between biomass and radial increment, rather than height, would become progressively more important during later years of growth where the use of dry weight/diameter correlations of Ford & Newbold (1970) would be appropriate. Combinations of both methods have been previously used in assessing biomass in 40 year-old coppice (Andersson, 1970).

Biomass, as measured here, and productivity clearly changes from coupe to coupe. Removal of old coppice appears to have its immediate effect, in terms of productivity, on ground flora cover. Only after 3 to 4 years of regeneration does the increase in hazel productivity enter a linear phase. In this critical period, lasting until year 8 or 9, significant and relatively rapid changes occur in the coupe habitats. Productivity in the hazel coupes declines slowly after the 9th. year. A static period of productivity however does not appear to have been reached yet.

The hazel productivity at Wetmoor however is not necessarily typical of hazel coppices generally. The distinctive characteristics of the surface-water gley soil, stocking densities, age and composition of the standard trees should also be noted in any comparison.

However it is clear that despite uniform woodland management practices, orthodox coppice techniques and apparently similar edaphic and biotic conditions within the surveyed area significant variations occur in the productivity and growth patterns of adjoining hazel coupes. We suggest these variations may arise, in part, from climatic differences occuring during the critical earliest years of coppice regeneration.

Of the environmental factors examined, coppicing notably affects the light intensity received at ground level in the coupes. Imposition of a coppice regime on long abandoned coupes results in a marked increase in light intensity (four-fold in the survey period). Conversely the slow regrowth of cut hazel stools results in a steady increase in shading reaching a maximum after some 12 years. Less pronounced but significant temperature changes also occur as the coupes mature, ground-level temperature decreases being recorded under the survey climatic conditions. Coppicing at Wetmoor does not appear to affect soil moisture content nor soil bulk density. Agencies which might cause soil compaction (cattle, visitors, commercial workings) are however restricted in the difficult access to this Nature Reserve.

The resumption of coppicing appears to have a pronounced but short-term effect on the ground flora. Coupe clearance results in a two to three-fold increase in the first two to four years in the mid-summer ground flora cover and biomass. Thereafter and associated with the steady increase in shading and perhaps temperature decline, the ground flora cover decreases to reach the low levels of abandoned coppice after 8 or 9 years. The results here are similar to the generalised pattern described by Rackham (1980).

Wetmoor forms part of a nature reserve where the management objectives include protection and development of the woodland habitat for wildlife conservation. Restoration of traditional coppice management has had pronounced effects on certain aspects of the Reserve environment. Twelve years of coppicing has severely modified hazel growth patterns. The form of hazel productivity has altered from the slow maturation and ageing of abandoned coppice to the vigorous regrowth of regenerating coupes. Apparent habitat uniformity has been replaced by habitats diverse in shading, in ground-level temperatures and in cover and biomass of ground flora. The transient but substantial increase in ground flora cover in the first few years of coppice regrowth may be an argument for maintaining relatively short coppice cycles where the object is to favour wildlife enrichment. However none of the habitat variations described here are likely to be new to the area but instead provide an opportunity for the natural re-establishment of a diverse woodland wildlife.

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THE HISTORY AND STATUS OF *CAREX DEPAUPERATA* CURTIS EX WITH., THE STARVED WOOD-SEDGE, IN THE AVON GORGE, BRISTOL

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INTRODUCTION

Carex depauperata, the Starved Wood-sedge (nomenclature follows Clapham, Tutin & Warburg (1981) and Dony, Rob & Perring (1974)) is one of the most endangered plants in the British Isles (Perring & Farrell 1983). In Jermy, Chater & David (1982), records are accepted from only six of the 10 km squares of the National Grid; it is only near Cheddar (Roe 1981) and in County Cork (Perring & Farrell 1983) that the plant is known to survive. In June and July, *C. depauperata* is readily recognisable by its large fruits and few-flowered spikes.

White (1912) described the sole record of this rare sedge from the Leigh Woods (v.c.6) side of the Avon Gorge in the following words: 'Leigh Woods, 1886; *Harold S. Thompson*. The single immature specimen that was gathered was put aside for some years before its importance was recognised. By that time Mr Thompson could not remember in which part of the woods he had found it. Mr A. Bennett confirmed the naming, and when the finder kindly forwarded the plant for my inspection I believed it to be right'. These circumstances have seemed sufficiently unusual for later botanists to dismiss or ignore the record (e.g. Perring & Walters 1962) or to treat it as unconfirmed (Roe 1981). This paper reassesses the evidence regarding the claimed occurrence of *C. depauperata* in Leigh Woods; in so doing it casts some light on the personalities of the Bristol botanists H. Stuart Thompson (1870-1940), the collector of the plant, and James W. White (1846-1932), the author of the *Flora of Bristol* and the President of this Society from 1907 to 1909.

HISTORY

In July 1901 the following short note written by Thompson (1901) was published: 'In May 1888 I gathered what I thought was a young specimen of *Carex sylvatica* in Leigh Woods ... but observing its resemblance to an immature form of *C. depauperata* from Mr Arthur Bennett, I sent my Bristol plant to him and he agrees it is *depauperata*'. Bennett (1843-1929) was at the time not only the recognised British authority on *Carex*, but was also the Referee of the Watson Botanical Exchange Club, of which Thompson was an active member and later the Secretary.

On 24 May 1901, Thompson sent a card to White (loose in White 1887 MS), 'You will be glad to hear that Mr Bennett says "I believe the *Carex* is *C. depauperata*" ... I will send you for inspection the *C. depauperata* if you like'. White replied on 1 June 1901 (Thompson correspondence), 'I am charmed to find that Mr Bennett assents to your *C. depauperata* from L. Wood. I do wish you had some memo of the date and locality but must be content. You certainly have the great gift ... of turning up rare plants in unexpected places' (three further Somerset examples are given in the discussion below).

Following receipt of the specimen, White wrote to Thompson on 22 November 1901 (Thompson correspondence), 'Your specimen ... is tantalising. I confess I could not conscientiously found a record on it were it unsupported by Bennett's opinion. How I wish I could look forward to finding the spot and the plant in fruit'. Elsewhere, however, White (1912 MS) more confidently noted, 'Nov. 1901. Though immature I believe it to be right'. The same opinion was later expressed in the *Flora of Bristol* (White 1912, see above). On 3 July 1911, having just seen the sedge at its recently rediscovered site near Cheddar, where it had not been seen since 1860 (see White 1912), White again wrote to Thompson, 'I wish we could refind your *Carex depauperata* in Leigh Woods'.

The specimen referred to survives in Thompson's herbarium, now at Birmingham University; the present author has a photograph of it. The gathering is 28cm tall, with good roots and four flowering stems. Though it lacked the distinctive large fruits, it was clear that the vegetative characters matched those of fruiting specimens at Birmingham University; in July 1980 Thompson's plant was confirmed as *C. depauperata* by R.W. David, one of the *Carex* referees for the Botanical Society of the British Isles.

DISCUSSION

HISTORICAL EVIDENCE

The voucher specimen having been shown to be genuine *C. depauperata*, despite the unconvincing statement of Bennett, 'I believe .. *C. depauperata*', and White's personal doubt as admitted to Thompson, it remains to consider the possibility that the specimen came from some place other than Leigh Woods.

Some confusion is evident regarding the date of the find. Thompson consistently used the date of May 1888, in his published account, on the specimen, and also in the annotation by *C. depauperata* in his copy of the *Flora of the Bristol Coal-field* (White 1887), 'Leigh Woods, Bristol, May 1888 H.S.T.'. At first White believed that no date was recorded (see his letter of 1 June 1901 quoted above) and a statement was published to that effect (White 1901). Later, but probably before having seen the specimen, White inserted the date 1886 in his notes (White 1912 MS). The same date was given in White (1912), from where it was copied by Marshall (1914). In May 1915 Thompson pointed out the error (White ann. in White 1912), which must have arisen through uncharacteristic carelessness on White's part, since he noted the reference to Thompson's short paper and doubtless had read it (White 1912 MS).

Thompson was certainly collecting in the Avon Gorge in May 1888: his herbarium contains plants from both sides of the Gorge gathered then (Thompson was not at the time in the habit of recording the exact date). *Arabis stricta* (= *A. scabra*), the Bristol Rock-cress, was gathered on the Clifton side and *Hornungia petraea*, the (Rock) Hutchinsia, was found on the Leigh Woods side. As a guide to the local flora, Thompson used his copy of White (1887), purchased in May 1888.

It remains possible that Thompson added the date of May 1888 to his specimen of *C. depauperata* some time after its collection. It is clear, though, that the specimen was dated prior to its identification by Bennett in May 1901: the epithet '*depauperata*' is added in a different ink. Nonetheless, the annotation previously referred to was presumably made after the identification, rather than at the time of the original find. The time interval between collection and identification does not necessarily imply that the specimen did not come from Leigh Woods. The locality near Cheddar was, as indicated above, not known at this time, although it may be mentioned that it was also in 1888 that Thompson discovered *Helianthemum apenninum*, the White Rock-rose, on Purn Hill, about 12km west of Cheddar (White 1912; Roe 1981). Thompson would also have had ample opportunity in the 1890's to obtain *C. depauperata* on the Continent, where the sedge is more common; he was, for instance, collecting in Switzerland in 1895 (Thompson correspondence 9 September 1895).

A similar pattern of delayed recognition took place with two other rare plants from Somerset. *Polygonum maritimum*, the Sea Knotgrass, was collected by Thompson between Brean and Burnham in 1882, when he was 12 (White 1912; Roe 1981). The specimen was seen by White in 1889. 'Your *Polygonum* took my breath away', he wrote to Thompson on 13 April 1889 (Thompson correspondence). *Limonium binervosum*, the Rock Sea-lavender, was gathered at Burnham in 1885 and was found in 1905 'in his first collection, not consulted for many years' (White 1912).

ECOLOGICAL EVIDENCE

C. depauperata is a plant of 'dry woods and hedgebanks on chalky and limestone soils' (Jermy, Chater & David 1982), so that Leigh Woods, an ancient woodland (Rackham 1982), containing on the Carboniferous Limestone several rare and local plants, is clearly an ecologically acceptable locality for the plant.

It is unfortunate that by 1901 Thompson 'could not remember in which part of the Woods he had found it' (White 1912; the manuscript account (White 1912 MS) reads less kindly, 'the exact spot was unrecorded and unremembered'). It could scarcely be expected that after 13 years Thompson would recall the precise spot whence he had gathered what he had believed to be an immature specimen of the common Wood-sedge, *C. sylvatica*.

It is possible that *C. depauperata* may have been lost from Leigh Woods since 1888 due to habitat changes. Shade has increased due to the abandonment of traditional woodland management (see Rackham 1976, 1982) and the planting of alien trees, particularly beech and conifers. Some suitable ground has been lost through quarrying and house-building.

It is also notable that *C. depauperata* was present in small quantity in Surrey (Lousley 1975) and that only 'one or two clumps' survive naturally near Cheddar (Roe 1981), though these have recently been supplemented with a number of propagated plants of local stock (see Willis 1982). The sedge may have had a similarly small population in Leigh Woods so that Thompson's gathering could have represented the last surviving plant. Despite extensive searching by the present author and others, *C. depauperata* has never again been seen in Leigh Woods.

CONCLUSION

Although at first sight the validity of the solitary record of *Carex depauperata* from Leigh Woods appears questionable, it is concluded that there is every likelihood that the sedge did formerly occur in Leigh Woods as a native plant, probably in small quantity. Indeed, the faint possibility that the sedge might survive is indicated by the discovery in Leigh Woods since 1950 of *Phegopteris connectilis*, the Beech Fern (Sandwith & Sandwith 1953) and *Tilia platyphyllos*, the Large-leaved Lime (Willis 1975), both in small sites at some distance from woodland paths.

Unfortunately, the investigations described above were not completed in time for the record to be included in the new *Flora of Somerset* (Roe 1981) as anything other than 'unconfirmed'; the author is now inclined to accept the record as correct (pers. comm. 1982). Although the Avon Gorge was not included in the distribution map of *C. depauperata* in Perring & Walters (1962), the locality has now been mapped as an old (pre-1950) record in Jermy, Chater & David (1982).

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THE PLANTING-UP OF THE GALLERY ROOF IN THE AVON GORGE, BRISTOL

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When the decision had been taken to construct a gallery over the Portway beneath the Suspension Bridge in the Avon Gorge, a meeting for interested parties was called by Avon County Council in November 1978 at which a model demonstrating the finished state of the Gallery was displayed. The intention was to cover the Gallery roof with hardcore and a layer of soil and then to plant-up with ornamental flowering shrubs.

Dr Frost and Mr Ames, supported by the Officers of the South-West Region of the Nature Conservancy Council, pointed out to Sir Gervas Walker, Chairman of the County Council, that such a plan would make the roof out-of-keeping with its natural surroundings and there would be a grave danger of the ornamental, alien shrubs spreading onto the cliffs threatening the survival of the rich assemblage of rare, native plants growing there.

Accordingly the Chairman instructed that alternative plans by the University botanists should be investigated and it was finally agreed to cover the base of the Gallery roof with coarse limestone chippings, with a layer of fine chippings above and a thin layer of sterilised Mendip loam on the surface. Mrs D. Hughes, the County Council Landscape Architect, devised a tasteful plan for the soil covering leaving scree-like areas of bare limestone chippings to blend with the cliff contours.

An English strain of *Festuca ovina* was recommended by the University botanists to be sown in the loam together with a mixture of wild, local grasses collected from the rocky slopes of Clifton Down, opposite Bristol Zoo. In the summer of 1981, work parties from the Bristol Youth Opportunities Centre collected this seed but owing to the protracted wet weather the seed of *Bromus erectus*, which dominates these slopes, appeared to be somewhat unripe.

After the establishment of a grassy sward on the roof, the University botanists indicated that they could provide material of certain rare or uncommon Gorge species, propagated in the University's Experimental Greenhouses, for planting-up on the roof.

The Council's Contractor was responsible for the supply and sowing of the *Festuca ovina* seed which was carried out in the autumn of 1981. Within a week of this sowing, about 28lb of the air-dried grass seed from Clifton Down was broadcast over the area, but could not be raked-in to the already sown surface.

In June 1982, the now well-established grassy sward on the roof was investigated by Mr Byfield (Table 1). In October 1982, further observations were made and 54 plants, from 8" pots, of *Veronica spicata* ssp. *hybrida* were planted in the sward in groups and in various depths of soil to test for the most suitable conditions for their establishment. These plants had been raised from seed produced in the University's Experimental Greenhouse from plants rescued by the University botanists in 1978 in the general area of St

Vincents Rocks before the removal there of unstable rocks.

The objectives of the planting-up programme were to establish rapidly an even sward of moderate height of *Festuca ovina* together with Gorge wild grasses in order to prevent the colonisation of the roof by quantities of rank weeds and then to enrich the established sward with rare Gorge flowering plants; the whole to blend the vegetation of the roof into its natural surroundings and to conserve some of the Gorge rarities.

By June 1982, the desired sward had been achieved and also contained *Dactylis glomerata, Lolium perenne, Poa trivialis* and *Holcus lanatus* which had probably arisen the collected Clifton seed, although some may have been partly derived from the seed of certain of these species growing on the neighbouring cliffs. However *Bromus erectus* was not seen until October 1982, and then in fairly small quantities on the margins of the bare chippings.

Table 1 indicates that in general, weed species were in small quantity. *Aethusa cynapium, Anagallis arvensis, Capsella bursa-pastoris, Coronopus didymus, Matricaria matricarioides* and *Polygonum aviculare* may have survived in the Mendip loam. Others such as *Artemisia vulgaris, Cirsium vulgare, Crepis capillaris* and *Sonchus oleraceus* probably came from the general area of the Portway and the base of the nearby cliffs.

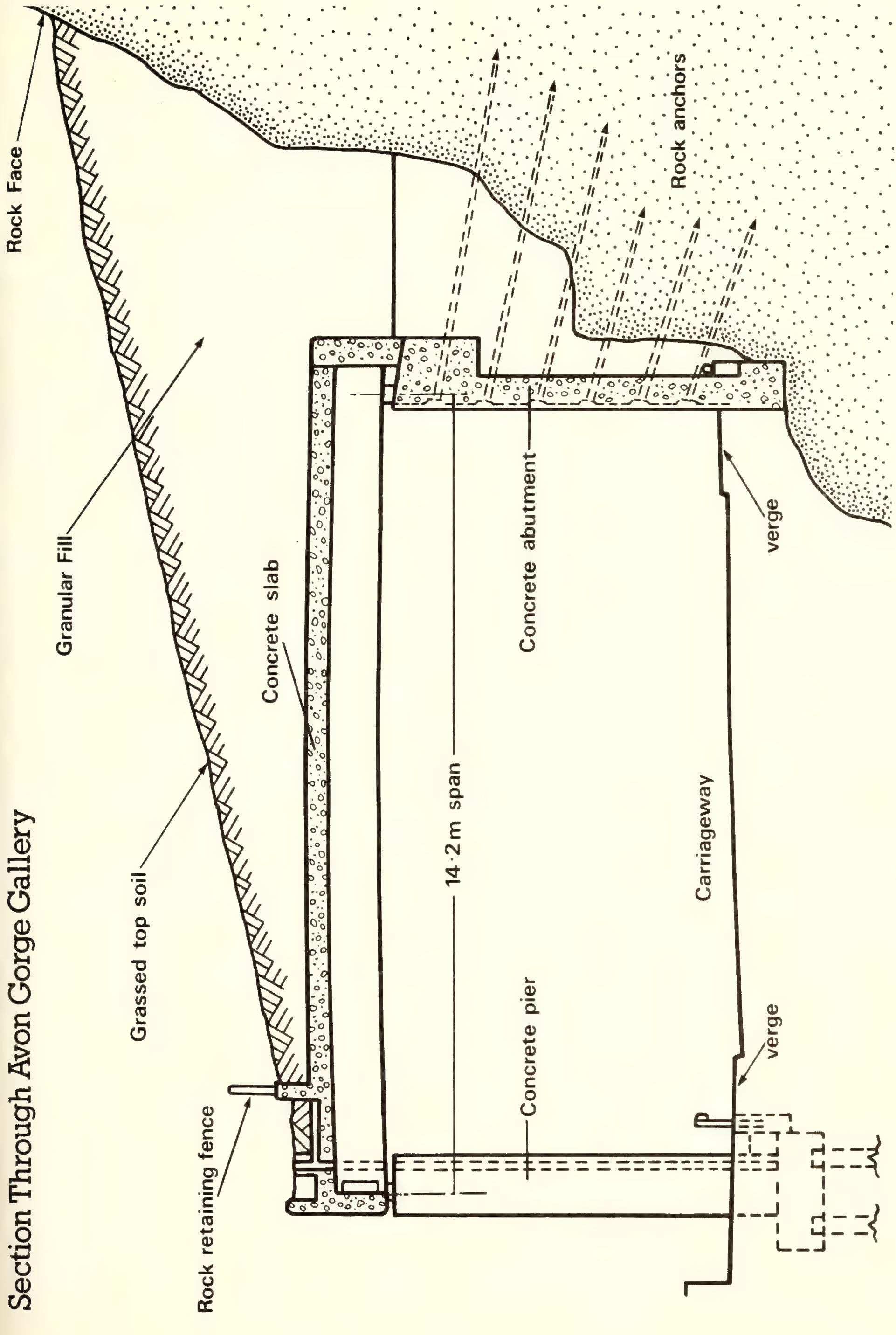
The planting-up of *Veronica spicata* ssp. *hybrida* in the established turf appears to have been successful; in March 1983 all 54 plants were surviving well. It is intended to plant-up further Gorge specialities in due course.

A major feature of interest was the number of aliens which appeared on the roof (Table 1). The evidence indicates that the sample of *Festuca ovina* seed sown by the Contractor must have been contaminated by alien seeds of foreign origin, which in turn casts doubt on the origin of the supposed "English strain" of *Festuca ovina*, recommended to be sown. Alien species such as *Anthoxanthum aristatum (A. puelii), Apera spica-venti, Lepidium sativum* and *Trifolium spumosum* must have come with the contaminated seed, as well as an abundance of *Vulpia myuros*, which otherwise occurs in small quantity as a native in the Gorge. Of particular interest was the abundance of *Anthoxanthum aristatum*, a very rare established introduction in cornfields in South-east England and a Threatened Plant (Threat No. 10E).

None of these introduced species is an aggressive alien and accordingly is unlikely to spread on to the surrounding cliffs or even to persist on the Gallery roof. Nevertheless, they make an interesting addition to the well documented alien flora of the Bristol area.

From the surrounding cliffs in the Gorge a number of long established garden escapes, such as *Cheiranthus cheiri* and *Centranthus ruber*, had invaded the roof, particularly on the margins of the bare chippings, and *C. cheiri* had spread considerably by March 1983.

Another feature of importance was that some of the rare and uncommon Gorge species on the cliffs in the neighbourhood have self-colonised the roof. In particular *Geranium purpureum* ssp. *purpureum*, a Threatened Species (Threat No. 10V), which during the removal of unsafe rocks was found by inspection from the cranes to be frequent on the Suspension Bridge buttress, has self-colonised the roof in small quantity. In addition *Arabis hirsuta*



Section Through Avon Gorge Gallery

Rock Face
Granular Fill
Grassed top soil
Rock retaining fence
Concrete slab
14·2m span
Concrete pier
Concrete abutment
Rock anchors
Carriageway
verge
verge

and *Acinos arvensis* have colonised the fine limestone gravel on the roof also in small quantity.

It should be noted that a few seedlings of *Acer pseudoplatanus* have colonised the roof and it is likely that the nearby *Fraxinus excelsior* will also invade. It will therefore be necessary in due course to remove such seedlings and to control aliens such as *C. cheiri*. It is also intended to continue monitoring the vegetation changes on the roof.

Species nomenclature used here follows Clapham, A.R., Tutin, T.G. & Warburg, E.F. (1981), *Excursion Flora of the British Isles* (3rd ed.); details of Threatened Species are taken from Perring, F.H. & Farrell, L. (1977), *British Red Data Books: 1. Vascular Plants*, and specifications of the Gallery from Avon County Council (1971), Avon Gorge Remedial Work and Gallery (with section and 18 illustrations in colour).

We wish to thank the Officials of Avon County Council for their co-operation and assistance, the Officers of the Nature Conservancy Council S.W. Region for their support and the Youth Opportunities Centre, the Downs Ranger and Mr C.M. Lovatt for their help. The work of the University botanists was financed by the Nature Conservancy Council and the University of Bristol Avon Gorge Appeal and accordingly we are grateful to all contributors to the Appeal.

TABLE 1. Flowering plants recorded and their frequencies on the Gallery Roof, Avon Gorge, 28 June 1982.

Acer pseudoplatanus	A few seedlings.
Acinos arvensis	A few plants in fine, bare shingle.
Aethusa cynapium	Rare.
Anagallis arvensis	Occasional.
Anthemis arvensis	c. 5 plants.
**Anthoxanthum aristatum*	c. 150 plants.
**Apera spica-venti*	c. 5 plants.
Arabis hirsuta	1 plant in fine, bare shingle.
Artemisia vulgaris	Rare.
Atriplex hastata	Rare.
Barbarea ?intermedia	c. 20-30 plants.
Bromus sterilis	Rare to occasional on gravel.
Capsella bursa-pastoris	Occasional.
Cardamine hirsuta	Rare to occasional.
**Centranthus ruber*	Rare.
**Cheiranthus cheiri*	Rare, at base of cliffs.
Cirsium vulgare	Rare.
Cochlearia anglica	1 plant.
Coronopus didymus	Rare.
Crepis capillaris	Occasional.
Dactylis glomerata	Occasional to frequent.
Epilobium roseum	Rare.
Festuca ovina	Dominant.
Galium aparine	Rare.
Geranium dissectum	Rare to occasional.
Geranium purpureum ssp. *purpureum*	c. 20-30 plants.
Geranium robertianum	Rare.
Geranium rotundifolium	Rare.
Holcus lanatus	Occasional.

*_Hordeum distichon_	2 plants.
Hordeum murinum	Occasional.
Hypochaeris radicata	Rare to occasional.
*_Lactuca serriola_	Rare to occasional.
*_Lepidium sativum_	3 plants.
Leucanthemum vulgare	Rare.
Lolium perenne ssp. _multiflorum_	Rare.
Lolium perenne ssp. _perenne_	Occasional.
*_Lunaria annua_	Rare.
Malva sylvestris	Rare.
*_Matricaria matricarioides_	Rare.
Medicago lupulina	Rare to occasional.
Papaver lecoqii	1 plant.
Papaver rhoeas	Rare.
*_Phaseolus vulgaris_	c. 20 plants.
Poa annua	Rare to occasional.
Poa trivialis	Rare.
Polygonum aviculare agg.	Rare.
Potentilla reptans	Rare.
Ranunculus repens	Occasional.
Rumex acetosa	Rare.
Rumex crispus	Rare.
Rumex obtusifolius	Rare.
Sedum acre	Rare.
Senecio jacobaea	Rare.
Senecio squalidus	Rare to occasional.
Senecio vulgaris	Rare.
Sinapis arvensis	Rare.
Sisymbrium officinale	Occasional.
Sonchus oleraceus	Occasional
Stellaria media	Rare.
Trifolium dubium	Occasional.
*_Trifolium spumosum_	1 plant.
Tripleurospermum inodorum	Occasional.
Urtica dioica	Rare.
Vicia sativa ssp. _sativa_	Occasional
Vulpia myuros	Abundant.

N.B. An asterisk denotes an alien plant.

Proceedings of the Bristol Naturalists' Society (1982), **42**: 45-47.

BREEDING WADERS OF WET MEADOWS SURVEY 1982

by H.E. ROSE

(Department of Mathematics, University of Bristol)

Wet or flooded meadows form one of the most threatened habitat types in Britain (Fuller 1982). The threat comes mainly from land 'improvements', often made with the aid of official funding. Flooding is reduced or eliminated, and the typical plant and animal life becomes scarce or disappears. With this in mind the BTO organised, with financial help from the RSPB, a Survey of Breeding Waders of Wet Meadows. The aim was to acquire as complete an inventory as possible of the wet meadow sites left in England and Wales in 1982, so that future changes could be monitored. In Scotland a slightly different survey, of waders breeding on agricultural land, was organised by H. Galbraith for the Scottish Ornithologists' Club and the Wader Study Group.

Record cards and 1:25000 maps were provided, on which sites were to be indicated and breeding territories marked. For each site, the observer recorded its wetness, with the extent and depth of any lying water; the land use (type of farming) in the area; and the species of waders and other wetland birds present, with an estimate of the numbers of breeding territories. Here we outline the results for Avon county. Copies of the record cards and maps have been deposited with the Regional Biological Records Centre at the City Museum, Bristol. On behalf of the BTO I extend thanks to all those who took part and helped to achieve an excellent degree of coverage.

As a first step, representatives of local ornithological groups met Dr Ken Smith, the BTO's national organiser for the survey, and listed 45 Avon sites that could be described as wet or flooded meadows. They ranged from 2 ha to 600 ha in area, with an average of 200 ha. Most sites were visited three times in the period April to June 1982; fewer visits were paid to some which, though normally wet, had dried out in the abnormally dry spring of 1982 and appeared to be carrying no breeding waders. The dry conditions may have depressed breeding numbers at other sites.

The land use was mainly for grazing, with some hay and about 5% each of silage and arable farming. Figure 1 shows the sites, distinguishing the ten which had standing water (enough to cover the toe of a boot) over at least 5% of their area in April. The 29 sites where waders were breeding are shown in Figure 2. The table gives the numbers of territories for the major species, for each 10 km square. Most records came from the Portbury area, the moors and the coastal strip from Clevedon to the River Yeo

DETAILED RESULTS

LAPWING Much the commonest breeding wader in Avon, it was present at 28 of the 29 breeding sites, and about 150 territories were held. Only two of the normally wet sites in north Avon held Lapwings, although they breed elsewhere in the area (Payne 1982, Rose 1982).

REDSHANK There were small colonies in the well-known sites on Portbury Wharf and behind the Clevedon Sea Wall, using the same fields as Lapwing. There have been few breeding reports from other places, so the 45 territories found are a good estimate of the county total.

SNIPE Drumming, the breeding display, was heard at 17 sites, all in the Portbury area or in the Gordano Valley. Until comparatively recently Snipe were considered (Palmer 1968) to breed only occasionally in the county, so this number is unexpectedly high.

CURLEW Some birds were present during the period of the survey, with possibly up to five territories being held, but there was no evidence of breeding.

OYSTERCATCHER Single pairs attempted to breed in the Royal Portbury Dock area and at the mouth of the Yeo. Successful breeding has been recorded at these places in the recent past.

OTHER WADERS Little Ringed Plover (two pairs), Ringed Plover (four or five pairs and Common Sandpiper (one pair) bred in the Royal Portbury Dock area, and young of all three species were seen. The nature of this site and its protection from disturbance make it increasingly attractive to breeding waders.

OTHER WETLAND SPECIES The following bred successfully (number of sites in parentheses): Mallard (33), Shelduck (7), Mute Swan (4), Moorhen (11), Skylark (6), Meadow Pipit (11), Yellow Wagtail (7), Sedge Warbler (15) and Reed Bunting (9). Several other species were noted at one or two sites.

CONCLUSION

Avon is a small county with great human pressure on its land resources, so it is not surprising that it has no large wetland breeding colonies. Although their breeding success is sometimes low, the species that use our wet meadows form a notable feature of the county's bird-life. One would like to think that the remaining wet sites will be preserved, but even now (Spring, 1983) development plans for the Royal Portbury Dock area appear to threaten one major site.

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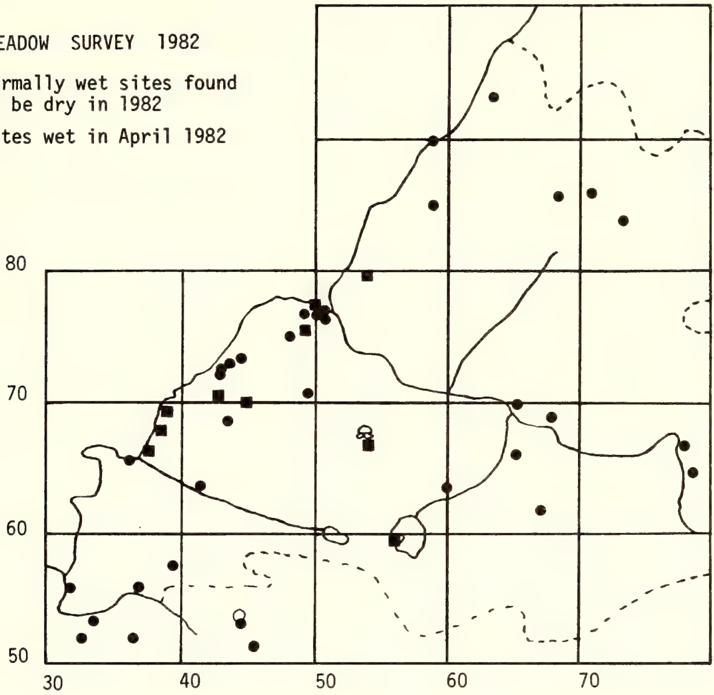
ESTIMATED NUMBERS OF WADER BREEDING TERRITORIES IN AVON WET MEADOWS, 1982

SITE		LAPWING	REDSHANK	SNIPE (drumming)
ST35		13	2	
ST36		13	12	
ST45		11		
ST46	(including Nailsea Moor)	21	3	
ST47	(Gordano Valley)	37		13
	(Portbury area)	35	28	4
	(remainder)	11		
ST55		2		
ST59		2		
ST66		4		
TOTAL		149	45	17

Fig.1 WET MEADOW SURVEY 1982

● Normally wet sites found to be dry in 1982

■ Sites wet in April 1982


80
70
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40
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Fig.2 SITES WITH WADER TERRITORIES

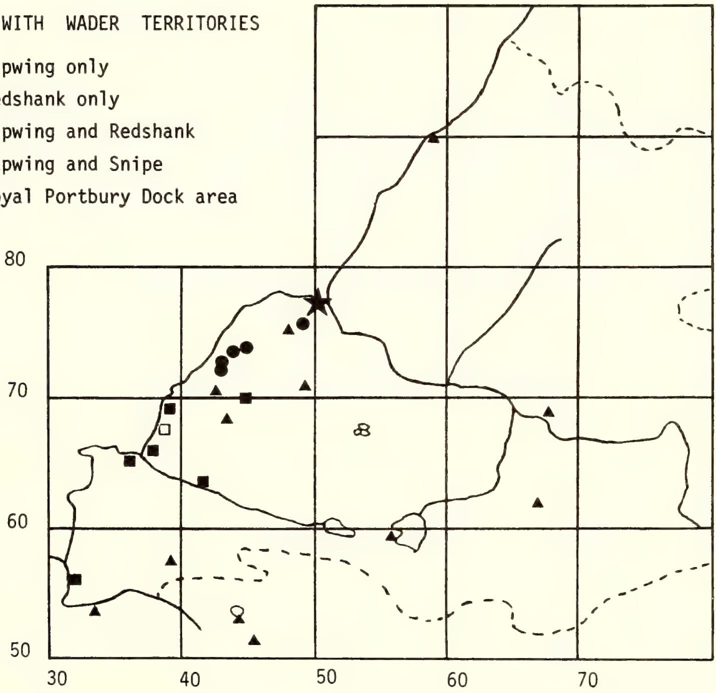
▲ Lapwing only

☐ Redshank only

■ Lapwing and Redshank

● Lapwing and Snipe

★ Royal Portbury Dock area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Proceedings of the Bristol Naturalists' Society (1982), 42: 49-80.

AVON BIRD REPORT, 1982

Compiled by a Committee of
BNS Ornithological Section
and Bristol Ornithological Club

P.J. Chadwick (Chairman)
H.R. Hammacott (Secretary)
B. Lancastle
H.E. Rose
A.J. Merritt
S.M. Taylor
R.G. Thomas
G. Youdale

INTRODUCTION

EDITORS

K.E. Vinicombe has left the Committee owing to the pressure of other ornithological responsibilities, and has been succeeded by A.J. Merritt. We thank G. Sweet for specialist advice, and M. Huxley for access to meteorological records from Long Ashton Research Station. In preparing this report we have considered 139 records of locally rare or 'difficult' species; we thank those who have lightened our task, and reduced the burden of correspondence, by sending in detailed reports. A decision not to publish a record means only that in our view the information available does not rule out alternative interpretations; it must not be taken as implying that we doubt the observer's competence. For 'national' rarities we adopt the verdicts of the British Birds Rarities Committee, some of which are long delayed; as we go to press, two are outstanding.

THE YEAR

From December 8, 1981 the country was gripped by sub-zero temperatures until the 25th, with little respite; on the 13th storms caused heavy damage and joined with a daytime thaw, abnormally high tides and heavy snowfalls to flood much of the Avon and Somerset lowlands; severe storms occurred on the 19th and 20th, and from the 26th there was a thaw in England and Wales. Much milder weather continued into January 1982, with temperatures up to 13°C, but on the 6th the cold returned with a north-easterly air flow. There were gales on the 7th and 8th, and some freezing rain on the 9th. On that night, in the West Midlands -26.1°C was recorded, the lowest ever in England and Wales; in Avon the coldest night was on the 13th/14th, when Long Ashton recorded -14.4°C. Southerly air brought a sudden thaw on the 15th, and the weather became so unseasonably mild that on average the month was not much colder than usual. The effects of the cold winter on birdlife are summarised later.

February was very dull, with mild south to west winds broken from the 15th by ten days of cooler easterlies. Whitefronted Geese returned to their Gloucestershire base early in the month, but some Bewick's Swans stayed on Severnside. Three Avocets were seen on the Severn late in the month. The first three weeks of March were unsettled and cool. Winds from the north-west and west discouraged early migrants; Wheatears were seen at several places in the county on the 18th and 21st, but Sand Martins not until the 23rd (on the 25th they were at a breeding site). Two Ring-billed Gulls arrived at Chew Valley Lake, and *British Birds* reported another at Sutton

Bingham, Somerset and six more near Plymouth. From March 25, a settled spell of much warmer south-westerlies developed.

Swallows and House Martins appeared locally on April 3 and 4; the first Redstart on the 8th and Yellow Wagtail on the 10th. An early Sedge Warbler was seen on the 10th, but no more until the 17th and 18th. By April 8, the weather was cooler but still dry and sunny, with winds from northerly points until cool, rainy westerly weather set in during the last week. Parties of kittiwakes visited CVL at mid-month. Early May saw cool, northerly winds, strong at times. The winter's last Fieldfares were noted on the 8th, over a month after the last Redwings. From the 10th warm, southerly air (broken by ten days of westerlies from the 19th) brought the main migrant stream. Several Lesser Grey Shrikes came too far north, one arriving at Portbury and two others in Wales. Locally there was a good Whimbrel passage, two Avocets were seen over the Severn, and a Dotterel was ringed. Ringed and Little Ringed Plovers reared young, but Oystercatchers bred unsuccessfully.

From June 8, a series of depressions brought cool, wet air with some heavy thunderstorms, making it one of the wettest Junes on record. Considerable numbers of Manx Shearwaters were seen over Weston Bay. In July, humid southerly air followed a week of cool north-westerlies, then easterlies from the 18th were followed by northerlies. Uncommon visitors at the reservoirs included three Black-necked Grebes, an Osprey, a Mediterranean Gull and a White-winged Black Tern. The Black Tern passage was relatively small. August had warm westerly weather up to the 18th, and then became cooler and unsettled as a series of depressions moved eastwards. Knot numbers on passage were the largest for ten years.

Winds in September were generally westerly, sometimes strong, though south-easterlies prevailed in the south from the 8th-19th. The winds produced Avon records of another Black-necked Grebe, a Slavonian Grebe, another Osprey, a Sabine's Gull, three Pectoral Sandpipers, including the first record for North Avon, two Grey Phalaropes and two more White-winged Black Terns. Avon's first Marsh Sandpiper and a Tawny Pipit, both seen in early October, can also be ascribed to September's gales. Very few Little Stints were seen on passage, but Curlew Sandpiper numbers were extraordinary, with parties of up to 55 on the Severn Estuary and over 40 at CVL. The last Whitethroats were noted on September 16, 21st and 30th; the last Sedge Warblers on the 19th, 20th and October 5.

October was generally mild but unsettled. Many Short-eared Owls entered Scotland and spread south, more than usual reaching the Avon coast. A Marsh Sandpiper, first seen on the 5th, and a Spotted Sandpiper on the 10th were both new species for the county. From the 15th a sequence of fast-moving depressions produced westerlies, succeeded from the 23rd by clear, sunny weather. The last dates for Sand Martin were the 2nd and 12th: for Wheatear the 30th and 31st and for Swallow the 17th, 26th and November 6.

On November 7, westerlies, sometimes of gale force, returned until colder north-westerlies took over on the 13th. House Martins were last reported on the 1st, 6th and 13th. A Spoonbill at the Axe Estuary preceded records from Steart and the R. Exe. A Great Northern Diver, a Scaup, a Bittern and two more Mediterranean Gulls were also reported. Usually fine but sometimes cold weather set in during the last days of November, followed from the second week of December by a westerly, sometimes very wet, spell with near average temperatures. On December 4 a Slavonian Grebe took up residence at Barrow Gurney Reservoirs, and on the 29th a Cetti's Warbler was ringed at CVL.

EFFECTS OF THE 1981-82 COLD SPELL

As far as birdlife was concerned, important features of the winter were the unaccustomed cold in December; the very mild spell after Christmas; and the almost complete lack of glaze icing on vegetation.

An immediate effect of the cold was a great influx of birds to gardens. Fieldfares, Redwings, Pied Wagtails, Meadow Pipits, Reed Buntings, Bramblings and even Skylarks were seen in gardens and allotments in urban Bristol as well as in towns and villages, often feeding near houses. Twelve gardens taking part in the 'Birds in Avon Gardens' Survey run by R.L. Bland provided daily counts in December and January of the number of species and the number of birds present. Graphing the daily averages against the temperature at 8.00am gave good straight lines, the two months agreeing closely. On average, each fall of 5°C produced one more species and five more birds. For all 32 gardens taking part (12 in Bristol), weekly averages over the whole winter showed a significant inverse relation between temperature and both number of species and total bird numbers seen.

During the cold period this survey recorded 35 species besides thirteen usually present. Woodpigeon, Great Spotted Woodpecker, Jay, Fieldfare, Redwing, Mistle Thrush, Long-tailed Tit, Blackcap, Brambling and Bullfinch were all noted in the largest numbers since the survey began in 1975/76. Redwings came and went in December; Fieldfares came in December and stayed beyond the final thaw. The January cold brought the Bramblings, and some lingered into March. Siskins came in February, after the cold - perhaps returning from the south-west to find their food depleted.

There were many comments on the lack of small birds in the countryside. Thus, in a complete circuit of Blagdon Reservoir on January 16 no Robin, Dunnock, Wren or Song Thrush and only one Chaffinch was seen. Fieldwork for the BTO Winter Atlas shows the same point: averaging the county data shows that Wrens were being seen until December 7 at the rate of 2.7 birds/hour; over the next four weeks at 1.7 birds/hour; from January 8-31 at 0.6 per hour, and in February at the same rate. Some will have died and others moved into gardens, but few Wrens move long distances.

Most Fieldfares and Redwings moved to the south-west; large flocks were reported in South Devon and vast numbers in the Channel Islands. Lapwing, Dunlin and finch flocks moved too, many making a return movement after the Christmas thaw. Wigeon moved south-west in large numbers, many thousands gathering on the Somerset Levels. Counts suggest that about 2,000 paused on the Avon coast on the way.

During and after the first cold spell, many birds remained on, or moved to, fields along the shoreline. On December 24 TBS noted dense concentrations near Kingston Seymour, including over 1,000 Lapwing, over 2,000 Fieldfares, and 100 or so each of Black-headed and Common Gulls and of Redwings, and smaller numbers of Redshank and Dunlin. A week later, the area was almost deserted. On the other hand RGT reported that at the New Year there were plentiful flocks of Skylarks, Meadow Pipits, buntings and finches near Severn beach, but at the final thaw only one or two individuals remained.

As the reservoirs froze, waterfowl were dispersed, and small parties appeared in widely scattered places; details will be found in the systematic list. Considerable numbers went to the Severn Shore, including species not normally found there. On the morning after the final thaw, the shore in the area of Severn Beach held 300 Wigeon, 160 Teal, 127 Mallard, three Tufted Duck, three Eiders, six Pochard, two Goldeneye, three Great Crested Grebes, 19 Bewick's Swans and eight White-fronted Geese; RGT, who made these counts, comments that only the first three might be expected regularly, and that wader counts seemed little affected there by the cold except for Dunlin, for which the counts suggest a movement of several thousand through the area in December with a return later.

The final effect of the winter on small bird species could not be assessed until the BTO's Common Bird Census and Waterways Bird Survey data for the 1982 breeding season became available. Although these do not purport to give a measure for the entire United Kingdom population of any species, the general similarity of losses in different habitats indicates that perhaps a third to a half of the country's Wrens and Reed Buntings died, and a quarter of the Dunnocks, Robins, Pied Wagtails and Bullfinches. Meadow Pipits and Skylarks were reduced by about a fifth and a third, respectively. For some species these may well be understatements. For example, Wrens were on an upward trend, and might well have shown an appreciable increase but for the cold. On the other hand, some species had smaller losses than past evidence would have suggested. Long-tailed Tit, Treecreeper and Goldcrest are examples. It seems that these tree-canopy insect-feeders could maintain their food supply in the absence of glaze icing, while the feeders on or near the frozen ground suffered. Of riparian birds, Kingfishers suffered losses of perhaps two-thirds, and Moorhens and Grey Wagtails of a fifth. One species not covered by the BTO's indices is Stonechat; while subjective judgments can mislead, it is surely significant that we received not a single Avon breeding report in 1982, and a very much reduced number of records out of the breeding season.

It is fair to say that we still have much to learn about the impact of cold weather on our birds. Some of the evidence from 1981-82 is discussed in detail in *Bird Study*, 30(2), July 1983.

SYSTEMATIC LIST

The following list is based mainly on records sent to Bristol Naturalists' Society Ornithological Section or to Bristol Ornithological Club. It is our policy to identify observers only for rare or locally uncommon species, or in cases involving special problems of identification, or unusual dates, places, numbers or behaviour. The species sequence follows K.H. Voous' *List of Recent Holarctic Bird Species* (1977).

CONVENTIONS

To aid comparison with old information, data for some species are split between 'NA' and 'SA'. The former is the part of Avon formerly in Gloucestershire (in essence, the part north of the R. Avon) and SA is the remainder (the old Somerset Report District 1).

A few frequently occurring place names are abbreviated:

ASW - Avonmouth Sewage Disposal Works and its surroundings, including Hoar Gout.
CVL - Chew Valley Lake.
SGW - The Royal Portbury Dock, the rest of St George's Wharf

and Portbury Wharf.
Severnside - a general reference to the coast from Aust to the southern end of Chittening Wharf.

The notation [BBRC] means that a record has been accepted by the British Birds Rarities Committee.

In the tables, 'nil' means that a search was made and no birds found; 'n/c' means that in an otherwise regular series of counts that month was missed; a blank means that in a table compiled from general reports, none were received covering the entry in question.

ADDENDA

Data from earlier years for Eider, Kentish Plover and Great Skua have been incorporated under those entries below.

BLACK-THROATED DIVER

SA One at CVL, January 18 (SC, WE *et al.*) - the seventh record for Avon county, and the second for CVL.

GREAT NORTHERN DIVER

SA First-winter bird at Barrow Gurney Reservoirs, November 10-25 (AM, AW *et al.*).

LITTLE GREBE

NA Unusually widespread early in the year; reports, mostly of single birds, from Tortworth Lake, Littleton Pits, Dodington Park (four, Feb. 6), ASW, Eastville and St George Parks (Bristol), and on R. Avon at Ashton, from Netham to St Annes, at Hanham (four, Jan. 17) and Keynsham (seven). Breeding season records only from Littleton Pits (one, April 22 to July 3, but four, May 30) and Horton (two adults, August 11). No records for second winter period.

SA Noted in the January cold spell on Blind Yeo, Clevedon (one), and Bucklands Pool, Backwell (one). Breeding reports only from Blagdon Reservoir (2 broods, 6 young) and CVL (c. 20 broods, 14 young). In second winter period, noted in November at SGW (two on 28th), R. Kenn (two on 13th) and Yatton (one on 8th). Monthly maxima for reservoirs (Blagdon, Barrow Gurney and CVL) and R. Avon at Saltford:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
B.G.			1			1		2	6	4	2	2
Bl.	1	3	9	4	6		46	50	25	19	1	3
CVL	6	5	26+	30+		c40	46	76	76		11	4
Avon	3	2	1						1	2		5

GREAT CRESTED GREBE

Monthly maxima at reservoirs:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
B.G.	13	3	26	15	9	2	n/c	28	43	40	35	41
Bl.	12	7	28	32	34		15	9	4	7	7	19
CVL	20	18	74	52	146	175	345	460	480	120	385	260

Exodus in January cold from reservoirs (where two found dead) to coast and R. Avon - noted on 16th-17th at New Passage (3); Clevedon - R. Yeo (1); Axe Estuary (3); and at Netham, Hanham and Saltford (one each). Breeding reported only at Bl. (at least one brood) and CVL (31 broods, 56 young). The only other records were of single birds at Severn Beach (NA), November 22 and Bucklands Pool on June 24 and December 25-27.

RED-NECKED GREBE

SA At CVL the bird from December 1981 was still at Herriott's End on January 1, and another was at Hollow Brook from 1st to 7th. One was then seen sporadically from January 30 to April 20, by which time it was in full summer plumage (many observers).

SLAVONIAN GREBE

SA Adult in transitional plumage at CVL, September 18 (CFD) - an unusual date for the species. One at Barrow Gurney Reservoirs, December 4 into 1983 (DE, RDM *et al.*).

BLACK-NECKED GREBE

SA One, Blagdon Reservoir, July 29 and August 13 (JA, AHD & JSR). Two, thought to be juveniles, CVL, July 31 to August 7, then one on 8th (KEV *et al.*). Another here, September 4-14 (AHD *et al.*).

FULMAR

NA Five off Aust, June 28.

SA Noted only off Sand Point and Brean Down; reports on 13 dates from February 25 to June 27, mostly of one or two, but 6+ on May 1 and three, June 27, while on June 19 RA noted two up-channel and twelve down-channel; one or two on six dates, August 2-21st.

MANX SHEARWATER

SA Again noted only from Sand Point and Brean Down: six, May 1; ten on 11th; 13 on 30th; 363, June 19; 180 (Brean Down) and 75 (Sand Point) on 27th, and 65 on 28th.

STORM PETREL

NA One flew upstream off Severn Beach in SW gale, Nov 19 (RGT).

SA One down-channel past Sand Point, September 18 (PAA, GJF & LF).

GANNET

NA First-year bird to SW past Severn Beach, October 20.

SA One to NE off Clevedon, June 28; 23 to SW off Sand Point, June 19 against strong westerlies. Noted off Brean Down: three, May 1; 13, June 27; one, June 29; two, July 3 and three on 12th; three, August 7 and four on 20th. Dead birds: one, Weston Bay, November 13 and one at Portishead, 28th.

CORMORANT

Numbers at CVL continue to fall: winter counts only an eighth of 1976/77 figures; largest Avon roost is now in NA, on buoys at Oldbury Power Station. Monthly maxima there and at CVL were:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	11	13	11	9	3	5	4	13	14	9	4	7
CVL	10	10	4	4	2	3	2	10	4	10	11	13

Up to six on Severnside, August to December, otherwise up to four usual on coast. Besides CVL, noted inland at Barrow Gurney and Blagdon

Reservoirs (only three dates at former); and in ones and twos on R. Avon at Sea Mills, Hotwells and Saltford; on R. Yeo at Yatton, and on Nailsea Moor.

At least 27 nests in use on Steep Holm, April 10 (AJP).

BITTERN

SA The two at CVL in December 1981 stayed during January (many observers); then four records of single birds until March 21, but three seen on March 14 (KEV). One at CVL, November 17 and December 9 (PG, CA, PHM *et al.*).

GREY HERON

NA Most reports from Chittening, where maximum of ten, October 9.

SA Peak counts of 23 at CVL, November 6 and nine at Keynsham on 28th - lower than in recent years. Widespread reports of up to six, mostly from coast, reservoirs, moors and R. Avon. On July 3, two appeared to land on Steep Holm, and next day three flew to NE off Sand Point.

Occupied nests at heronries: Newton Park, five; Portbury, 17; Cleeve, 36 and Uphill, 7. Regular in summer also at Woodenhouse Court, Corston (two birds), Barrow Wood and Clevedon Court (one nest at latter in 1980).

SPOONBILL

SA One on Axe Estuary, November 7 and 13 (RA, CFD).

MUTE SWAN

NA One breeding record - a brood in St George Park, Bristol. Wintering flock in Bristol City Docks reached 36 in January, but only 17 in December. At Chittening, up to ten in late January and 11 on June 12; at ASW, peak of seven on February 21 and March 1.

SA Breeding records: Wills' Lake, Hartcliffe (vandals shot brood); Buckland's Pool (10 young); Chelvey (nest); Nailsea Moor (brood); Kenn Moor (at least one brood); Blagdon Reservoir (exceptional five broods but only 11 young reared) and CVL (6 broods, 28 young). Monthly maxima at reservoirs:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bl.	2	7	10	20	17	18	34	40	37	36	6	31
CVL	12	12	15	20	18	81	110	113	80*	10	12	10

* plus nine killed by foxes

BEWICK'S SWAN

NA Often seen on Severnside, January 15 to March 14, usually at Northwick Warth, where up to 19 noted. The only record after March was of three to S over Pilning, November 23.

SA In first winter period, all records were in January: up to five at CVL, 16th-27th; five (possibly same birds) at Barrow Gurney Reservoirs on 17th-18th and over Cadbury Camp Lane on 18th; one at Sand Bay on 16th; two, Clevedon - R. Yeo on 26th and ten over Nailsea on 31st. Present in autumn at CVL from October 24 (peak of 42 on December 29) and at Blagdon from Nov. 13 (peak of 45, December 11 and 49 on 12th); birds commuted between the reservoirs. Other records: seven over Axe Estuary, November 7; one to W over Hengrove Park, Bristol on 30th and one at Yeo Estuary, late December.

WHITE-FRONTED GOOSE

Widely reported, mostly in flight, during January cold.

NA Frequently noted on Severnside up to February 2, with maxima of 43 to NE on January 1, and 50 feeding on 19th; the latter may well have been involved in records of 125 at Hallen on 14th, 33 there on 15th and 16 at Compton Greenfield on 19th. Reports also of 56 over Sneyd Park, Bristol on 10th and 31 grey geese, presumably this species, over NE Bristol on 16th. One flew west over Rudgeway on March 23. One other record: two at Northwick on December 30.

SA January reports from nine areas: the largest counts were 90 over Knowle, Bristol and 25 to NW at Weston-s-Mare, both on 10th; 17 feeding at Saltford on 17th and 53 to W there on 25th; and 25 at SGW on 17th. A grey goose was noted on Nailsea Moor on February 6. Only one record in the second winter period: a party of ten at CVL, December 4 to 12th.

GREYLAG GOOSE

All records presumed to be of feral birds - a flock of 100-150 resides in the Slimbridge/Frampton area of Gloucestershire.

NA Flock heard over Clifton, Bristol on evening of January 30; 36 had been seen on Tealham Moor, Somerset that day.

SA Single birds at Axe Estuary on February 25; at CVL on March 25 and from April 21 to year-end; Clevedon to R. Yeo on April 3 and December 5. On October 31 a flock of 22 flew down Clevedon coast and along R. Yeo. On Nov. 7, a flock of 25 appeared at CVL.

CANADA GOOSE

NA Unusual record of 100 over Cromhall, January 10 - presumably related to birds from Frampton, Glos. In Bristol, one in City Docks at Bristol Bridge and occasionally in nearby Feeder Canal, January 20 to February 18. Two at New Passage, October 12.

SA Monthly maxima at CVL show unusual December influx:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CVL	113	107	54	28	44	97	113	112	107	113	107	140

Present at Blagdon Reservoir from February 13 to November 13, with maximum (16) on former date. On R. Avon, eight at Bath, February 27 (present since December 1981) and three at Saltford, March 30 to April 25. One Bucklands Pool, April 1. Two flew over Brislington, Bristol, April 16, also seen over Keynsham. Bred at CVL (8 broods, 37 young) and for first time at Blagdon Reservoir (1 brood, 4 young, reduced to 2).

BRENT GOOSE

NA One at Severn Beach on December 4.

SA One at Axe Estuary on April 4. Six at Blackstone Rocks, Clevedon, November 7, and first-winter bird at CVL, December 25-27. As usual, all were of the dark-bellied race.

SHELDUCK

County total 300-350 up to mid-April and 180 in mid-May (ten at CVL, 70 on coast in SA and remainder in NA). About 33 remained in mid-July (plus 70 juveniles) and 30 in mid-September; by late December, total was about 250. (These figures exclude occasional flocks of 100 or more in Axe Estuary, which appear to come from the Somerset coast).

Inland: parties of 21 on Nailsea Moor, February 6 and eight on Kenn Moor, May 24; and occasionally up to four elsewhere. At the reservoirs, occasionally one or two at Barrow Gurney and Blagdon, and up to 11 at CVL.

About 130 young reached the coast (70 in NA). Also at least four pairs nested on Steep Holm where clutches of 9 and 15 failed and at least nine hatched from the other two; and nine hand-reared young were released at Portishead on July 8 (MTD). Two pairs bred at CVL - broods of 6 and 10 seen on June 5; only five survived up to July 3 and one to July 31.

WIGEON

Present in all months; largest total, during mid-January thaw, included 675 on the coast. Slow build-up in autumn: under ten to end of August, c.20 in mid-September, then as in table. Other notable counts from Sand Bay (220, January 16 but none on 17th when Clevedon - R. Yeo counted); and 230 on Severnside, March 7 (only 22 on 8th).

	Jan 16-17	Feb 13-14	Mar 13-14	:	Oct 16-17	Nov 12-14	Dec 9-12
Severnside	300	4	nil	:	12	(3)	42
SGW	(25)	65	100	:	nil	25	35
Clevedon-Yeo	350	7	nil	:	nil	nil	3
Blagdon Res.	325	275	150	:	24	121	205
CVL	41	147	153	:	70	195	435
County total	1090	530	405	:	110	345	720

GADWALL

NA Two at Tortworth Lake, February 14-21; female at ASW, June 26; two at OPS, December 5.

SA Again bred on Knowle Hill nr CVL (9 eggs), at Blagdon Reservoir (5 broods) and CVL. Total at Blagdon and CVL under 30 in January, but 70-80, April and May. Sharp influx at CVL in July: 83 on 16th; 245 on 31st; peak of 365 on August 15; 255 on 27th; 130 through September. Total at all reservoirs 55-60 in November and December. Noted at Barrow Gurney Resrs. (five, Jan. 3; two, Mar. 14 and Nov. 10); R. Yeo at Yatton (five, Jan. 16) Bucklands Pool (two, Feb. 4-10); Axe Estuary (one, March 13) and two near Clevedon (Dec. 5).

TEAL

Reported in every month. In January and December, when most present, 100% variation from day to day was noted at reservoirs and sometimes on the coast. Table gives mid-month Wildfowl Count figures.

	Jan 16-19	Feb 13-14	Mar 13-14	:	Sep 11-12	Oct 16-17	Nov 12-15	Dec 11-14
Severnside	325	60	57	:	4	46	94	126
SGW	(45)	185	250	:	20	140	5	50
Clevedon-Yeo	75	nil	5	:	16	2	nil	10
Blagdon Res.	555	420	110	:	38	132	475	398
CVL	529	226	189	:	850	620	640	1035

Present in January, February and late summer onwards at Oldbury on Severn (max. 57, October 2) and ASW (max. 60, January 17). Other flocks noted: 200 at Sheperdine, 200 on flood water at Compton Greenfield, 518 at Barrow Gurney Reservoirs, and up to 100 at Sand Bay and Axe Estuary in January, 225 at Aust in February, 65 at Littleton Pits and 300 on Severnside in December.

MALLARD

A fairly typical year with peak numbers in post-breeding period - total over 3500 in September. Breeding noted in 33 places.

	Jan 16-17	Feb 13-15	:	Aug 20-22	Sep 11-12	Oct 16-17	Nov 12-15	Dec 11-12
Severnside	127	12	:	30	12	90	78	63
ASW	74	(60)	:	48	19	57	(40)	52
SGW	(150)	250	:	150	400	450	400	300
Sand Bay	49	60	:	n/c	140	82	53	50
Axe Estuary	250	250	:	n/c	220	212	143	180
Barrow G.	n/c	93	:	116	(170)	(230)	200	(220)
Blagdon Res.	295	105	:	780	381	308	264	726
CVL	398	113	:	1620	1900	520	700	820

Coastal total from Clevedon to R. Yeo usually under 20, but 65 on August 15 and 35 on October 10. Data from R. Avon, Keynsham to Sea Mills, suggest winter total of 200-250.

PINTAIL

Very small numbers; most widespread in January (5 localities) but the only counts over nine were 12 on 6th and 11 on 7th at CVL. Up to 14 at CVL in late October and 13 in early November.

GARGANEY

NA Pair seen flying up-river off Severn Beach on April 13th.

SA Present at CVL from March 26 to October 3 with monthly maxima of 3, 7, 3, 2, 2, 12, 3 and 1. Noted at Blagdon Reservoir from July 28 to September 14, with maxima of five, July 29-30 and again August 27-30 (when only two at CVL) and two on September 14.

SHOVELER

Fewer than usual. At CVL, 200 in early January, then some left (see table); 160 in late July, 275 by August 27 (when ten at Blagdon) and over 405 on September 28. Apart from major sites (table), largest counts were from Barrow Gurney Reservoirs (30, October); Bucklands Pool (eight, December); Oldbury (30, October onwards); SGW (20, February); Clevedon coast (13, June 27 - unusual date); one or two occasionally elsewhere on coast.

	Jan 16-17	Feb 13	Mar 13-14	:	Sep 11-12	Oct 16	Nov 12-16	Dec 11-12
ASW	30	20	4	:	7	(5)	9	40
Blagdon	50	20	21	:	4	113	62	10
CVL	39	62	52	:	375	110	165	10

POCHARD

Noted at 16 sites in January, many more than usual: on R. Avon up to Saltford, in Bristol City Docks, on several minor waters and at four coastal sites. Mid-January total was c.550, of which 319 were at Barrow Gurney Reservoirs; 125 still there on 24th, but no other count reached 100 before July. Post-breeding flocks began to assemble at Blagdon and CVL in July, increased to 500+ by August 7 (87 at Blagdon, 425 at CVL), and then dispersed - there was only one count of 100 in September. More arrived in November perhaps from Cheddar Reservoir, Somerset. Mid-monthly counts in second winter period:

	Sep 11-15	Oct 16-17	Nov 10-13	Dec 11-12
ASW	2	2	14	11
Barrow G.	(13)	(35)	87	80
Blagdon	10	9	450	56
CVL	65	60	425	285

No breeding records received.

TUFTED DUCK

Dispersal in January's hard weather led to reports from 18 sites (five along R. Avon through Bristol to Saltford), compared with usual seven or eight.

NA Up to 38 at Tortworth Lake in January - February and 30 on October 30. Regular at ASW (up to seven), January - March and September onwards. In Bristol, up to 27 at City Docks in January and 20 at St George Park Lake, January - February. On Severnside up to seven in January and up to three in March and September. Single birds at OPS on August 2 and October 6.

SA Spring passage smaller than usual, with peak of 385 at CVL in April, but mid-month Wildfowl Counts at reservoirs show many more in autumn:

	Jan	Feb	Mar	:	Aug	Sep	Oct	Nov	Dec
Barrow G.	136	53	23	:	100		60	90	(75)
Blagdon	60	200	245	:	488	395	294	195	134
CVL	71	81	182	:	250	355	75	235	180

Post-breeding flock developed by mid-July, varying from 25 to 585 at Blagdon and 180 to 490 at CVL as birds moved from one to the other through yachting and fishery disturbance. Other reports from Bucklands Pool (up to 25 in January and up to 15, February, March and October onwards); small numbers on R. Avon at Saltford up to April and in December; and single males on coast at Axe Estuary in January and December.

SCAUP

Records with full supporting details - a juvenile at Barrow Gurney Reservoirs, November 18-25, and one off Chittening (NA) on unusual date of July 18. Several other reports had insufficient details to rule out hybrids or lacked any description at all. (See also page 78 - escapes & hybrids).

EIDER

NA Party of five off Severnside from January 1-7 and again from 16th-30th; and a female there on December 7.

SA One at SGW on January 9. Four (one an immature male) off Clevedon on December 5, and one off Sand Point on 11th.

LONG-TAILED DUCK

Small influx from October 16: immature male at OPS until November 7; single females at CVL on latter date, off Severn Beach on December 17, at Portishead Boating Lake from 22nd to 26th, and at Barrow Gurney Reservoirs from December 26 into 1983.

COMMON SCOTER

NA Adult male on Littleton Pits on June 30. Immature male off Aust on July 17. Female on Severnside, October 18-19.

SA Female off Sand Point, February 27 - March 7; two there on November 27. Off Brean Down, adult male on March 1 and again on November 20, and three birds on August 7. Female at CVL on April 10 and perhaps same one on R. Avon at Saltford on 13th-15th. Male off Portishead on August 14; female or immature at CVL on December 29.

GOLDENEYE

NA Two off Severnside on January 16, one on March 17 and one on Oct. 21. Single birds on R. Avon at Saltford, January 14-16 and at Hotwells, Bristol on 15th. At OPS, one on February 27 and six on December 29. At ASW, two on December 8 and one on 16th-17th.

SA Recorded at eight sites in January (usually only on the three reservoirs listed below), including five off Birnbeck Pier, Weston-s-Mare on 13th, three in Sand Bay on 17th and four on R. Yeo at Congresbury on same day. Mid-month counts:

	Jan 17	Feb 13	Mar 13	:	Nov 12-14	Dec 11
Barrow Gurney	5	6	2	:	5	12
Blagdon	8	33	31	:	6	8
CVL	7	11	16	:	23	18

Counts on other dates often widely different, but table fairly represents winter population. Marked increase in April at CVL, where evening counts peaked at 118 on 10th. Last spring record was of one at CVL on May 8 and first in autumn, two there on August 14.

SMEW

SA One at Blagdon Reservoir on January 3. At CVL, a female was present from January 22 to February 20, then two from 23rd to 27th; one there, December 28-30.

RED-BREASTED MERGANSER

NA Two 'brownheads' flew up-river off Severn Beach, December 3.

SA Female at CVL from October 31, 1981 stayed until February 20. Male flying up-channel off Portishead on May 29. Adult female at SGW from July 18 until September 21. Single brownheads off Sand Point, October 30 and at Barrow Gurney Reservoirs, November 10-13.

GOOSANDER

No records from NA. In SA, noted at eight sites in January, including two off Clevedon coast and on R. Avon, nine at Hanham and 18 between Saltford and Keynsham. In latter area, eleven in February, three in March and one as late as April 19. As usual, most were at CVL, where maximum monthly counts were as follows:

	Jan	Feb	Mar	Apr	:	Oct	Nov	Dec
CVL	64	45	22	3	:	5	21	33

Up to four noted at Barrow Gurney and Blagdon Reservoirs. In autumn: one at CVL on September 6, then five there on October 29.

NORTH AMERICAN RUDDY DUCK

NA Single birds on R. Avon (Hotwells, Bristol) on January 13-14, at ASW on 18th and off New Passage on February 3.

SA Male found on road at Churchill, January 21. Male at Bucklands Pool, Backwell, 22nd-26th. At reservoirs, occasional at Barrow Gurney (up to three in January and October, one in November and four in December) but as usual main numbers were at Blagdon and CVL, where mid-month Wildfowl Count totals were:

	Jan	Feb	Mar	:	Oct	Nov	Dec
Blagdon	218	34	65	:	14	61	81
CVL	8	135	92	:	50	315	430

Other high counts or estimates from CVL were 505 on January 4; 408 on February 3; 180 on March 26; and 600 on December 28. From Blagdon the only other high figure was 415 on December 31 (there were only 78 at CVL on 30th). A few summered at CVL: 13 there in May, six in June and nine for most of July - but none bred.

HARRIER species

SA A 'ringtail', Sand Point, May 8 (BNS).

MONTAGU'S HARRIER

A female or immature, near Marshfield, August 3 (AJM).

HEN HARRIER

Single female or immature birds in January at CVL on 2nd, (KEV *et al.*), Chittening Warth on 3rd (TGE, JDRV) and Stantonbury Hill on 7th (THS), also on Kenn Moor on February 20-21 (HRH, FGQT), and at Portishead, May 13 (TBS). Single males, Filton Airfield, March 9 (FGQT) and Kingston Seymour, October 27 (PJC). Female or immature, Northwick Warth, November 6 (DE, BL).

SPARROWHAWK

Survey by BNS and BOC members showed 51 nest sites in use and 22 more probably occupied - a substantial increase on the numbers found in previous years. One was seen hunting Swifts at Barrow Gurney on June 27. There were a few records of individuals at the Starling roost at Temple Meads Station, Bristol, and other records of Blackbird, Redwing, Greenfinch and House Sparrow being taken. A juvenile female was seen at Severn Beach on Sept. 6 'jumping up and down' on a Starling, which escaped when a Crow distracted the Sparrowhawk.

COMMON BUZZARD

Survey by BNS and BOC members recorded 36 nest sites in use and 16 more probably occupied. The largest counts of birds were seven, at Wraxall on March 26 and again on April 6.

Probably only two nests succeeded in an area where breeding had previously been prolific. The poor success was attributed to high population density; many territorial disputes were observed, probably leading to eggs being chilled or predated.

OSPREY

SA One at CVL, July 24 - August 3 (many observers) and another on September 22 (SC, AJM). One at Blagdon Reservoir, July 26 (PJC). One flew SW over Keynsham, August 25 (AHD).

KESTREL

Joint BNS/BOC survey located only 35 nest sites in use. Population level appeared normal, and it is likely that sites were under-recorded through difficulty in locating them. Maximum numbers seen together were 7 birds at Chittening Warth on August 28. Two pairs were displaying together near Portbury on May 7, and four birds were noted at Cadbury Camp on May 9.

MERLIN

Few records early in year - female on Severnside until end of March, observed taking a Redshank on January 23 (BL, NTL & RGT); and single birds at Portbury on January 16 and 23 (AFS).

A female flew south across CVL on September 12 (KJH, JW). Noted on coast again from October: at Severnside, an immature male on 16th and 20th and a male from the 28th to November 5; a female, seen with the male on Oct. 30, stayed to year-end, being noted less frequently in late December (BL, NTL & RGT). Single females at Clevedon, October 24, Portbury, December 18 (RDM) and Axe Estuary, December 19 and 21 (PAA). Inland: single female/immature birds noted at Horton on October 17 (PJC) and over Fishponds, Bristol, November 1 (AHD); immature male at Hinton Hill, November 25 (PJC); and one hunting over Kenn Moor, December 22 and 24 (AFS).

HOBBY

Spring records, April 18 to May 25, from Yeo Estuary, Sand Point, Axe Estuary, Hengrove Park (Bristol) and Bath, including a party of three birds. Reports during the summer months suggest that one pair was probably and three more pairs were possibly breeding. The last record was of one flying south near Clevedon, September 5.

PEREGRINE

Substantially more records than in recent years; noted up to April 8, from May 8-22 and from June 30 onwards.

Single birds at Severnside frequently up to April 1 (sometimes adult, sometimes immature); on Clevedon Sea Wall, January 31; in Sand Bay area, Jan. 30 and Feb. 12; in the Gordano Valley on February 14; at the Axe Estuary and CVL on April 8; at SGW, June 29; on Clevedon Sea Wall on 30th and again several times in August, September and November; frequently on Steep Holm from July 3 (but no evidence of breeding there - AJP); in Sand Point/Sand Bay area, regularly from July 3 to November 3; on Severnside (first-year bird, July 5 and 13th, and many records in August onwards, often on shingle banks on river; adult and immature together on December 9). Pair flew west over Rangeworthy on August 20; other records from well inland of single birds on Kenn Moor in October and December, in Tickenham/Failand area on November 20, at Blagdon Reservoir and CVL on November 13, and at CVL on December 4.

Reports of prey taken include a feral pigeon 'dispatched in a cloud of feathers', a Black-headed Gull, a Little Tern and a Little Owl; attacks on a Kestrel and Starlings also noted.

RED-LEGGED PARTRIDGE

NA Records (21) from 15 areas, of which seven were in 10-km square ST77, four in ST78, two in ST68 and one each in ST58 and ST69. Coveys of 11 at Codrington in October and 23 near Dyrham Park in November, otherwise one or two birds only. Bred at Rangeworthy, where pair and seven juveniles seen in August and September.

SA Noted at nine sites (six of which were in ST66); bred near Dunkerton (ST75) and almost certainly at Wooscombe Bottom (ST66).

GREY PARTRIDGE

NA Reported from ten areas (six in 10-km square ST77, two in ST68 and one each in ST58 and ST88). Largest covey size was six - at Chittening (February 5), Tormarton (August 31) and Marshfield (December 29).

SA Reported from ten areas (eight in ST66 and one each in ST47 and ST75); all records were of one or two birds only, except for ten at Burrington (January 10) and up to 17 at Saltford from late November to mid-December.

WATER RAIL

No records from NA. Single birds at Congresbury in January, Portbury (side of A369 road) and Wellow Brook in February and Freshford, Bath in November. Noted at CVL from January (four on 17th) to mid-May and from August to December - usually one or two, but sudden increase in first ten days of October, with peak of eight on 4th.

MOORHEN

Again few breeding records - eggs or young reported at eleven sites, cf. twelve in 1981. Largest numbers noted in August and September, with 40 at Blagdon Reservoir on August 12 and 40 at CVL on September 11.

COOT

Reported at sixteen places during January cold weather, cf. three to six in rest of year. Largest numbers in August, when the county total exceeded 2,100 (cf. 1,100 in first winter period), with 1570 at CVL; by mid-September numbers at Blagdon and CVL nearly equal (875 and 812 respectively on 11th). Breeding reported in NA at ASW and Lower Kilcott Millpond; and in SA at CVL, Blagdon Reservoir, Hunstrete Lake and the Kennet and Avon Canal.

OYSTERCATCHER

NA Up to three at OPS in May, August and October. At Severnside, regular until April 25 (max. eight) and from July 4 on (max. four).

SA Present all year on coast from R. Avon to R. Banwell; usually under twelve but flocks of up to 30 in August and 20 in September, and 15 on December 11. Sand Bay: up to 70 in January and February, then three or four occasionally to May 5; up to 17 in July, and up to 52 from September onwards. Axe Estuary: up to 110 from January to March, 20 on April 8 and up to 120 from August 16 onwards. Pairs nested unsuccessfully at SGW and Yeo Estuary. At reservoirs, up to five at CVL, July 13 to September 25; one at Barrow Gurney on August 8 and one at Blagdon on September 18.

AVOCET

NA Three at OPS, February 27 (JDRV). Two in flight at Aust, May 23 (PJC).

SA One at Axe Estuary, December 4 (CFD).

LITTLE RINGED PLOVER

NA Chittening: pair bred; four chicks hatched and three fledged (BL, NTL & RGT). Juvenile seen at ASW, August 7 (NTL).

SA SGW: two pairs hatched seven young (MTD). One at Yeo Estuary on August 14 (TBS). Inland, one on Kenn Moor on August 17; otherwise only at reservoirs: at CVL, one April 24; one, May 2 and two on 12th; in autumn single birds from July 3-31 and up to four to October 10 (all juveniles except for single adults on five July dates, two on August 1, three on 10th and one on 24th); at Barrow Gurney, one on May 3; at Blagdon, one on July 30 and a juvenile on August 7.

RINGED PLOVER

Table gives monthly maxima in main areas: OPS and Severnside in NA, and SGW, Clevedon to R. Banwell, Sand Bay, Axe Estuary and CVL in SA. Except for 23 at Portishead on January 26, no more than five noted elsewhere. At SGW 8-10 adults present and six young reared (MTD).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	2	nil	5	2	100	2	20	400	250	70	9	11
S'side	23	19	3	27	231	14	15	460	278	23	35	50
SGW	3	20	14	8	20	25	20	250	80	40	n/c	30
Cl-RB	2	1	nil	9	60	13	2	80	12	3	3	nil
SBay	120	n/c	3	n/c	8	17	n/c	150	300	n/c	30	26
Axe	50	n/c	n/c	n/c	40	n/c	11	50	88	50	22	62
CVL	nil	nil	nil	nil	nil	nil	1	65	42	32	1	nil

KENTISH PLOVER

A very belated report has been received via the BTO of one shot 'at Bristol' on August 31, 1972, which had been ringed at Plougoulin, Finistere, France (326km S) on July 6, 1972. This was the first recovery of a ringed Kentish Plover in Britain and the fourth of only eight records of the species in Avon.

DOTTEREL

NA A female was ringed at Pucklechurch on May 11 (CJS, RJS).

GOLDEN PLOVER

NA One or two occasionally on Severnside in January, May, July, September and November. Inland records from Dyrham Park (10 in Feb.), Tormarton (16 in Oct.), Pucklechurch (70 in Oct and 35 in Dec.), Rangeworthy (273 in Dec.) and Nibley (200 in Dec.).

SA Noted up to April 24 and from August 11 onwards. Records of 100 or more from Saltford (306 in Jan.), Marksbury (150 in Feb.), Axe Estuary (100, Sept.), Clevedon - R. Yeo (115, Oct.) and Kenn Moor (140, Oct.), and CVL (190 in Nov. and 200, Dec). Other reservoir records only from CVL - single birds on January 1, February 7 and September 23 and 28, but up to 50 in October. Hard-weather movements noted on January 7: 90 to SW at Keynsham and 53 inland from Channel at Sand Bay.

GREY PLOVER

NA Two at OPS, October 3-6 and one, November 7. Severnside: up to three in January; occasional single birds in February, May-June and August-September; and up to eleven, October 13 onwards.

SA Noted up to May 9 (max. 11, Clevedon and 9, Sand Bay) and from September 25 onwards (max. 35 at Clevedon in October and 37 at Axe Estuary in November). At CVL, one or two from August 25 until November 9, but nine on October 10.

LAPWING

See report by H.E. Rose, page 45, for some breeding data. Table gives counts for much-frequented areas with maxima over 400: Northwick in NA and SGW, Clevedon - R. Banwell, Axe Estuary and Nailsea Moor in SA. Other counts over 400: in NA at Tormarton (745 in October) and Rangeworthy (1720 in December) in NA; and in SA at CVL (950 in November).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N'w	300	85	nil	nil	1	300	1000	800	350	500	470	450

SGW	1200	350	200	60	75	200	300	275	300	300	230	300
C-RB	220	70	42	25	26	500	140	750	120	120	150	120
Axe	250	500							1500	700	600	2000
NM					36	370	580	700	80	11	350	450

Hard-weather movements to SW noted, January 7-9, at several places, the heaviest being 100/hr at Keynsham on 7th.

KNOT

NA OPS: four on August 21 and five on September 5. At Severnside, frequently noted from July 25 onwards: generally ten or fewer, but 51 on August 27, 61 on September 1 and 80 on 5th and 18th.

SA Recorded on coast up to April 12 (max. 147, Sand Bay, Jan. 7) and from August 14 onwards (maxima 110 at Sand Bay and 650 in Axe Estuary in December). Latter is largest coastal count since 1972. At CVL, one on May 27; up to seven from August 30 to October 14, but 15 on August 30 and 17 on October 2.

SANDERLING

The only winter record was of one at Axe Estuary on January 1.
Spring passage: April 12 to May 28; up to ten at Severnside, four at Clevedon and single birds at SGW, Sand Bay and CVL.
Autumn passage: July 21 to September 19; up to three at OPS, two on Severnside, five at SGW and 15 at Sand Bay; also single birds at CVL in July and September.

LITTLE STINT

Spring passage: one at Severn Beach on May 8 and two on 19th. Autumn passage from August 4 to October 23; up to four at OPS, single birds at Severn Beach, Sand Bay and Blagdon Reservoir, and up to four at CVL, though none before September 18.

PECTORAL SANDPIPER

NA One at ASW, September 11-19 (BG, BL, NTL) - first NA record.

SA CVL: one, September 14-18 and two, 19th - 29th (many obs.).

CURLEW SANDPIPER

Winter: one at Yeo Estuary on January 10 (HER). Spring: one in breeding plumage, Severn Beach, May 18-19. Autumn: noted from August 22 to November 6. In NA, one or two at OPS; at Severnside, generally up to seven but unprecedented numbers from late September:- 30 on 28th, 55 on 29th, 47 on 30th falling to twelve on October 2. In SA, up to twelve at SGW, single birds at Clevedon and up to four at Sand Bay. Present at CVL from August 29 to October 17, with maxima of six in August, 13 in September (but 21 on 12th) and three in October.

PURPLE SANDPIPER

NA Present on Severnside up to February 15 (max. three) and from October 23 onwards (max. six).

SA Three at Middle Hope on January 2 and one on February 17. One at SGW on February 13 and two at Birnbeck Island, Weston-s-Mare on 14th; singles at Sand Point on March 27 and on October 30, and four at SGW on December 12.

DUNLIN

Table gives monthly maxima in main areas: OPS and Severnside in NA; and SGW, Clevedon to R. Banwell, Sand Bay, Axe Estuary and CVL in SA. Other counts in excess of 30 from Sea Mills (80 on February 12) and Blagdon Reservoir (80, Oct. 17 and 60, Nov. 13).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	400	550	75	8	100	2	81	190	500	500	1500	250
S's.	3500	1450	70	287	800	11	1000	780	250	850	3000	3750
SGW	750	200	120	120	75	100	135	150	75	100	175	1000
C-RB	3200	1800	950	360	520	12	55	70	15	350	1750	2200
SBay	4400	950	n/c	n/c	230	7	400	600	360	88	400	1700
Axe	3000	2500	30	7	n/c	n/c	n/c	100	60	200	800	2000
CVL	29	3	1	3	7	nil	12	57	25	60	170	75

RUFF

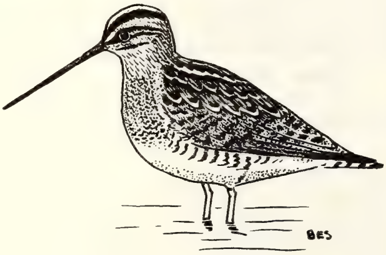
One winter record: two at Axe Estuary on January 2. Spring: one at CVL on April 17 and two at Severn Beach on May 12. Autumn passage July 18 to October 16: in NA, up to three at Severn Beach and ASW on four dates in July and August; and in SA up to three at SGW, Clevedon-R. Yeo and Axe Estuary on eight dates in August and September; also at CVL from July 21, with up to seven in August and twelve, September and October; and at Blag-Blagdon Reservoir, one or two on five dates in August and October.

JACK SNIPE

Recorded up to April 24 and from October 10 onwards. In NA, one or two regularly at Chittening, and one at ASW on October 10. In SA, up to five, Clevedon - R. Yeo and up to six at Sand Bay, in each period. Inland: single birds at Bucklands Pool on January 1; Kenn Moor, February 23 and 27th; Blagdon Reservoir on October and CVL on December 4.

SNIPE

Coast: 31 records up to May 23, the largest numbers being 17, Clevedon to R. Yeo in January, nine at Sand Bay in March and seven there in April. In June noted only at SGW (up to four). Of 48 records from July 18 onwards, only six were of more than twelve birds, the highest being of 27 at Axe Estuary in November.



Inland: noted at Reservoirs up to March 31 (max. six at Barrow Gurney, six at Blagdon and 16 at CVL) and from July 10 onwards (maxima of 72 at CVL in September and at Blagdon in October, and ten at Barrow Gurney in November). Of 77 other inland records only four referred to ten or more birds: 37 at Saltford in January, 18 on Kenn Moor in February, 20 at Ashton Marsh in March and 38 on Nailsea Moor in November. See page 46 for breeding season details; there was no proof of breeding in the county.

WOODCOCK

Noted up to March 11 (up to four near Wickwar, and single birds at Horton, Easter Compton, North Stoke, Saltford, Abbots Leigh and CVL) and in November and December (single birds at Dyrham, Abbots Leigh and Leigh Woods, three at Failand and nine reported shot at Stantonbury).

BLACK-TAILED GODWIT

Two at Portbury on May 18 - the only spring record. Autumn passage from July 3 to September 22 with up to six on Severnside, five at SGW, seven at Clevedon - R. Yeo, three at Sand Bay and four at CVL.

BAR-TAILED GODWIT

Noted on coast in every month. Peak of spring passage April 24-28, with maxima of 18 on Severnside, 30 at SGW and 51, Clevedon - R. Yeo. Autumn passage records were of up to eight birds, but 15 at OPS on October 2, twelve on 16th, and twelve at SGW on October 2 and 17th. Inland only at CVL, where seven on September 12, one on October 8 and one on November 9.

WHIMBREL

Of 41 spring records (April 12 - June 6), eleven referred to 20 or more birds, with maxima of 25 at SGW, 77 at Clevedon - R. Yeo, 35 at Sand Bay and 15 at CVL. Smaller numbers in autumn (July 10 to October 9), with only four counts of over eight: 14, Clevedon - R. Yeo, 18 at Middle Hope, 16 at Sand Bay and nine at SGW and CVL.

CURLEW

Table gives monthly maxima in main areas: OPS, Severnside, R. Avon, (Sea Mills) in NA; and SGW, Clevedon - R. Banwell, Sand Bay, Axe Estuary and CVL in SA:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	10	nil	4	9	76	nil	1	3	nil	400	12	80
S's.	174	233	140	59	21	83	221	240	160	214	174	147
Avon	3	21	15	nil	nil	nil	nil	nil	nil	nil	1	8
SGW	300	100	280	150	30	20	nil	50	50	30	10	140
C-RB	45	70	45	50	41	100	105	170	105	110	85	70
SBay	170	211	200	85	4	160	120	158	200	66	120	n/c
Axe	100	205	130	n/c	n/c	n/c	n/c	n/c	n/c	114	220	300
CVL	1	nil	1	nil	nil	3	1	1	16	1	1	nil

SPOTTED REDSHANK

One spring record: one at CVL on March 20. In autumn, one or two at CVL from August 14, up to eight in September, up to six to end of October and two to November 8; and at Blagdon Reservoir, one on September 13 and two, October 17; on coast, three at Sand Bay, September 5; one at Severn Beach on 9th - the only NA record. Three at Clevedon, December 12.

REDSHANK

Table gives monthly maxima in main areas (see under Curlew). Breeding proved at SGW, where 13 pairs raised 41 young, and at Weston Moor (3 chicks); see also page 45. (H.E. Rose paper).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OPS	130	62	55	16	nil	8	50	95	1	n/c	40	13
S's.	187	204	220	nil	nil	30	191	284	15	280	213	226
Avon	85	155	65	1	nil	14	5	42	75	110	90	90
SGW	55	70	250	175	50	15	100	50	410	300	14	40
C-RB	85	105	125	50	30	75	35	95	115	135	90	130
SBay	50	50						80	200		50	64
Axe	15	80	20				24	30	80	80	200	80
CVL	1	nil	2	nil	nil	2	4	2	3	1	nil	nil

MARSH SANDPIPER

SA One at CVL on October 3-4, moved to Blagdon Reservoir from 5th to 12th (DJM, IRM, JT *et al.*). First record for Avon. [BBRC]

GREENSHANK

Spring: at SGW one, May 15 and one on 23rd; one, CVL on 16th. Autumn passage July 9 - October 26. In NA up to four at Severnside and ASW in August, single birds at OPS and Severnside in September and at Littleton Pits in October. In SA up to four at Clevedon in August, five in September and one in October; at Sand Bay up to three on eleven dates between July 31 and September 10; at CVL one or two in July (first on 9th), then maxima of ten in August, 14 in September and four in October (last on 18th); at Blagdon Reservoir up to six in August and one on three dates in September - October; at Barrow Gurney one on October 2; at Abbots Leigh one, August 30.

GREEN SANDPIPER

Coastal records up to April 28 and from July 3 onwards. Table gives monthly maxima at SGW and reservoirs. Elsewhere on coast and inland (Abbots Leigh, Portbury, Easton-in-Gordano and moors) usually one or two, but occasionally up to six in first period and up to five in second; only one December record - one at ASW on 30th.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SGW	4	3	4	4			13	11	1		1	1
BG								1	4			
Bl							7	2				
CVL				1		1*	7	15	7	3	4	1

* (on 26th)

WOOD SANDPIPER

NA ASW: one, July 18 (BR) and one, August 1-10 (BL, NTL & RGT).

SA SGW: one, August 2-8 and one on 22nd (MTD, GJU). Reservoirs: one at Blagdon, July 30 and two, August 7 (CN, CJS, KEV); at CVL, one or two throughout August (but three on 6th and four on 7th) and single birds on September 2, 26th and 27th (many observers).

COMMON SANDPIPER

Winter: six at CVL and one, Blagdon Reservoir, January 18; one on R. Avon (Sea Mills) up to March 5 and in November; up to three at SGW, February and March, and four in December.

Spring passage April 7 - June 19. Up to three on coast; on R. Avon, up to six at Sea Mills, two at Keynsham, eight at Saltford and one at Freshford; one at Bucklands Pool, Backwell on May 12; at reservoirs, from three to six at Barrow Gurney; up to 24 at Blagdon in May; at CVL up to 15 in April and up to 17 in May.

Pair bred at SGW and hatched three young (MTD).

Autumn passage June 27 - October 31, with maxima of 13 at Severnside, three at ASW, five on R. Avon, six at SGW and 14 on Clevedon coast. Reservoir maxima, July to October - Barrow Gurney: 0, 3, 11, 4; Blagdon: 1, 13, 1, 4; CVL: 16, 31, 2, 2.

SPOTTED SANDPIPER

SA One at CVL on October 10 (TAG) - first Avon record. [BBRC]

TURNSTONE

Monthly maxima in main areas (Severnside, SGW and Clevedon):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S's.	105	89	100	30	50	2	26	165	88	144	120	100
SGW	17	20	12	6	11	nil	12	7	4	10	30	3
Clev.	18	19	29	3	3	nil	nil	10	23	22	16	15

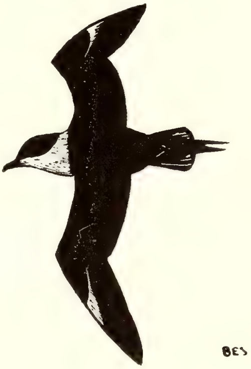
Six at OPS, January 28 and four, October 3; other coastal records of one or two. Inland, one or two at CVL between July 25 and August 20.

GREY PHALAROPE

SA One at CVL on September 28 and two on 29th. (DEB, JRC, DW).

ARCTIC SKUA

A good year - 17 birds recorded. Off Severnside: two, May 5, one on 25th, two on September 27 and one on October 19 (all dark phase). Off SGW, one on August 2; off Weston-s-mare, single birds on May 1 (pale), June 29, August 14 (dark) and 20th (juvenile). At Blagdon Reservoir, one (pale) on August 17. At CVL, one pale and two dark on September 11; one (dark) on 22nd and one on October 9.



LONG-TAILED SKUA

NA A juvenile off New Passage, October 4, 1981 (PJM, AF).

SA An adult at CVL on August 10 (PAA, CFD), described as follows:-

> 'Appeared slightly larger than Sandwich Tern; short, straight bill; uniformly dark brownish upperparts including dark head-cap and very long tail (as long as body); underparts, throat and cheeks light, appearing white. Flight very buoyant, purposeful and tern-like'.

GREAT SKUA

Single birds off Axe Estuary on May 1 and August 20, off Sand Point on May 9 and at CVL on October 16 and 17th.

GULLS

We have received no records of breeding and few roost counts. For the larger gulls, there have in fact been few records of any kind. We urge observers to report all gull observations.

MEDITERRANEAN GULL

Reports continue to increase; most are of birds at roosts in company with Black-headed and Common Gulls. At CVL, noted on eight dates to March 13 (at least two individuals) and on ten dates from August 29 to December 29 (at least four); also a first-summer bird on July 26. One at Barrow Gurney Reservoirs on two November dates. One (possibly two) at Compton Martin on February 21 and one off Weston-s-Mare on November 20.

LITTLE GULL

Single adults at CVL, February 14 and March 26. Marked spring movement: one at Oldbury on Severn, April 12; up to five (three adults) at CVL, April 15-21; up to five at ASW, April 17 - May 10; one at Bucklands Pool, April 7-15, and one at Saltford on 10th. Noted in autumn only at CVL: single birds on August 19, 21 and 28; up to four, September 4-29; single birds, October 2-12 and 18th, November 6 (adult) and November 13 (juvenile).

SABINE'S GULL

One was present at CVL from September 12 to 20th; it was usually seen at roost with Black-headed Gulls (many observers).

BLACK-HEADED GULL

Noted throughout county. Table gives monthly maxima at sites counted regularly: Severn Beach to Chittening, R. Avon up to Bristol City Docks, Clevedon to R. Yeo, Weston Bay and Axe Estuary, and Bucklands Pool. Note the April exodus to breeding areas and the return in July.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SB-C	630	2500	1750	600	41	350	2300	2500	400	1500	1650	1500
Avon	750	900	1200	90	15	80	1500	800	1300	350	1200	1800
Cl-Y	300	350	250	30	15	120	1400	1400	750	450	600	1000
Axe						250	1500		1000			3000
BP	600	1150	180	10				20				970

Other reports of 500 or more from Stidcot nr Tytherington (500, March); Hallen (910, July); Queen Charlton (560, September); Portbury (500, March); Abbots Leigh (700, March); Wraxall (600, October); near Wrington (1,200, September); Sand Bay (up to 1,000 in July and 1,100 in December); and at the reservoirs - at Barrow Gurney, 910 in October; at Blagdon, 1,350 in March, 510 in August and 1,100 in December; at CVL, up to 15,000 at roost on Feb. 1 and 1,150 on Aug. 1.

RING-BILLED GULL

An adult bird was noted at CVL on January 2 and 3 and on March 14, and - possibly a different individual - on March 20 and 25 (PJH, KEV, AW *et al.*). [BBRC]

COMMON GULL

Recorded widely on Cotswolds and in Severn Estuary; unusually high numbers at southern coastal sites in November and December. Present all year, but very few from April to late July. Counts of 100 or more in NA from various sites in ST77: 1,200 in January, 250+ in October and 1050 in December; also from OPS (280, March); Wickwar (300) and Hallen (150) in February; Hawkesbury (100+ in July), Wick (370, November); and Old Sodbury (240) and Charmy Down (250) in December. Counts of 100 or more in SA from CVL (300+ in February; Blagdon Reservoir (130, December); Yeo Estuary (120, November and 100, December); Sand Bay (140, November and 300, December) and Weston Bay (250, December).

Leucistic bird at CVL, March 7-25 (CJS, KEV). Adult with all but outer primaries pure white at CVL, December 30 (AM). One found dead at Keynsham, January 3, had been ringed as a three-year-old at Matsalu Reserve, Estonian SSSR, on May 4, 1973.

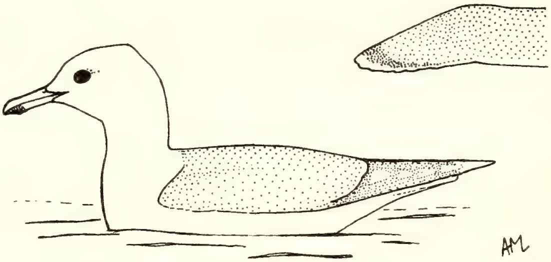
LESSER BLACK-BACKED GULL

Considerable numbers in December, otherwise a typical year. Regular counts from Severnside (max. 14, January); R. Avon, Sea Mills (max. 28, April); Clevedon to R. Yeo (max. 20, July and November); Bucklands Pool (max. 37, December). Counts of 40 or more in NA on R. Avon, Netham (50, January);

at Cold Ashton (83, August and 49, September); Lansdown (66, August and 162, September); and Dyrham Park (74, August and 62, September). Counts of 40 or more in SA at Sand Bay (144, Dec. - high count for site); Axe Estuary (45 in Dec.); Barrow Gurney Reservoirs (67 in October and 500+ on December 29) and at CVL (60 on February 1 and a remarkable 2,060 roosting on December 30). Birds showing the dark Scandinavian-type plumage noted at Oldbury on Severn (two, April) and Axe Estuary (three, December).

HERRING GULL
Very few records received. The only counts over 40 were of 300 at CVL on February 1; 65 (mainly first-year) at Sea Mills on June 6; 74 at Old Down, Alveston on August 25 and 64 at Barrow Gurney Reservoirs on October 22. Single yellow-legged birds, probably of the race *L. a. michahellis*, noted at CVL on February 6 and 10th, July 22 and September 9 (KEV *et al.*).

ICELAND GULL
One at CVL, April 16 (AJH, KEV *et al.*); typical Iceland Gull features noted - compared with Herring Gull, more peaked forehead, finer and straighter bill, longer wings (crossed at rest), possibly slightly paler upperparts and similar size. The following features suggested that it might belong to the North-east Canadian race *L. glaucoides kumlieni* (Kumlien's Gull): at rest only the primary tips appeared white, although they totally lacked black. The spread wing showed sub-terminal grey spots on the outer primaries - darker than the ground colour of the wing, and a white trailing edge right across the primaries, recalling an adult Little Gull.



GLAUCOUS GULL
First-winter bird off Axe Estuary on December 10 (BR).

GREAT BLACK-BACKED GULL
Noted only at Oldbury on Severn, Severnside, Sea Mills, Clevedon to R. Yeo, Barrow Gurney Reservoirs and CVL. At most four (usually one or two) but nine in April and 25 in August at Oldbury, and two adults and eight juveniles at Severnside on August 4-5.

KITTIWAKE
A good year; records in every month except July, with quite large numbers involved. Table gives monthly maxima at main sites: Aust to Severn Beach, Clevedon to Sand Bay, Weston Bay and Axe Estuary, and CVL. One at Portbury, January 29.

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A-SB*	360	450		40						170	
Cl-SB	1	2		1	9					30	
Axe**		3		100							25
CVL		1	18				1	1	1		

* Noted on 11 days in March, with 150 or more on four, on six days in May, and on eight days in November.

** Noted on six days in May - mainly low numbers.

Additional data for 1981: adult off Portishead and immature bird over Portbury Hundred, January 3; thirty flew up-channel off Brean Down on March 26.

SANDWICH TERN

Spring: one at CVL on May 3 and two on 19th. In autumn, 14 birds noted: one at Ashton Gate, Bristol, July 23; two at Blagdon Reservoir, August 18; remainder at CVL - one, July 11, then up to three on six dates from 28th to August 24, and three on October 1; a juvenile stayed from August 19 to 21st.

COMMON TERN and ARCTIC TERN

Spring passage April 4 to June 20: four, Portishead, May 12 and two, June 1; all other records came from CVL and were mostly of Common Terns, with a maximum of 13 Arctic on April 1. Autumn passage July 3 to November 28, noted at points on entire coast (max. 17 at New Passage, August 29). Inland: two at Keynsham, October 1-15; in Bristol, three at Hotwells, September 19 and one in City Docks, October 2; all other records were from reservoirs and of fewer than eight, except at CVL where maxima of 60 Common, August 29 and a record 31 Arctic on September 28; juvenile Common at Barrow Gurney from November 10 was last seen on 28th by TB - the latest county date.

LITTLE TERN

None noted in spring, and only five records of single birds in autumn: at CVL on August 2 (many observers); on Severnside on 13th (JWD) and Sept. 27 (BL, NTL); one dead (killed by Peregrine) at Clevedon, September 9 (HER); and an immature bird at Barrow Gurney Reservoirs on October 17 (TB).

ROSEATE TERN

SA One of this very uncommon passage migrant species was seen at Blackstone Rocks, Clevedon on May 23 (HER).

BLACK TERN

Spring passage noted only at CVL, April 21 - June 26; maximum count, 13 on May 11. Autumn passage, from July 9 to October 6, was small compared with recent years: single birds noted at ASW on August 2; Blagdon Reservoir, Sept. 11; Axe Estuary on 20th and SGW on 28th; all other records came from CVL, where maximum count was 40 on September 21.

WHITE-WINGED BLACK TERN

SA Three records, all at CVL: adult, July 20 (N & LT); adult already in winter plumage, September 18 (AHD, PJH); and juvenile from 20th to 23rd (KEV, AJM *et al.*). [BBRC]

GUILLEMOT

Single birds at Portishead, January 26 and Severn Beach on 31st; New Passage, August 30; Clevedon (dead), October 27 and Severn Beach, December 1.

STOCK DOVE

Widely reported throughout the year; largest flocks at Old Sodbury (max. 454, February), CVL (max. 400, November) and Chittening (250, late December). Breeding season records from 28 one-km squares.

WOODPIGEON

Widespread reports throughout the year. Largest flocks: 500 near Wickwar and 300, Olveston in January; 235 at Codrington and 300 at Kelston Park in February.

COLLARED DOVE

Widespread reports in most months included only one large flock: 190 at Dyrham on January 24; breeding season reports from 66 one-km squares, 44 of which were in NA.

TURTLE DOVE

Reports, May 8 - September 16, from twelve places in NA and eight in SA; 20 singing males in NA in May and June.

CUCKOO

Reports, April 14 - August 31, from 26 places in NA and 35 in SA; five birds at Chittening, April 30 and eight at CVL, May 15. Breeding confirmed in only two areas, both in SA.

BARN OWL

Maintains tenuous hold: reports throughout the year from two sites in NA and six in SA, all of single birds except for two at CVL on January 12 - one digging in snow. One found dead at Saltford and three on M5 motorway in SA: one of latter, found at Tickenham on March 30, had been ringed as a nestling on July 30, 1981 at Yarracombe, Devon. No breeding records.

LITTLE OWL

Reports throughout the year from 31 locations in NA (bred at two) and 57 in SA (bred at five).

TAWNY OWL

Reports in all months from eight locations in NA (including the only two breeding records received) and 36 in SA.

LONG-EARED OWL

SA One present on Kenn Moor from December 6-26 (MAS, TBS). Only 12-13 records in previous 30 years, of which 7-8 were in 1975/76.

SHORT-EARED OWL

NA Up to five on Severnside, February 4 - March 1, three in early March, and one to May 5. One at Shepherdine, October 9; present at Severnside again from October 17, with three on 23rd - 26th and one or two in November and December.

SA Single birds at CVL, Yeo Estuary and Sand Bay in January (four at latter on 14th), and at SGW on many dates up to April 8 (perhaps birds from Severnside). One at SGW on unusual date of August 29. Unusual number of autumn records: one or two noted from October 10 onwards at Keynsham, Whitchurch old airport, SGW, CVL, Nailsea and Kenn Moors, Clevedon coast, Yeo Estuary, Hewish, Sand Point and Steep Holm.

SWIFT

First noted on April 24; one at Bucklands Pool and six at CVL. Main influx from May 1 (200 at CVL, reaching 5000 by 5th but only 1000 on 11th); only large feeding flocks noted were also at CVL - 3000 on June 12 and July 3. Other reports from 22 widespread places; last record, one to SW at Keynsham, September 19.

KINGFISHER

Reports in all months from seven sites in NA and fourteen in SA (breeding confirmed at three of latter). Reported to be scarce, or numbers declined, at CVL, Saltford, and on Cam, Wellow and Midford Brooks after the cold winter.

HOOPOE

SA One seen at Uphill on April 11 (ALP per AJM). Has occurred in 27 of the last 35 years.

GREEN WOODPECKER

Widespread reports in all months from 30 NA and 44 SA areas.

GREAT SPOTTED WOODPECKER

Reported in all months from 27 NA and 23 SA areas.

LESSER SPOTTED WOODPECKER

Reported in all months from five NA and eight SA areas.

SKYLARK

Singing males reported during breeding season from 252 one-km grid squares. (Over 4-year period, presence noted in 521 squares).

SAND MARTIN

Recorded from March 23 to October 12; peak migration counts at CVL of 300 on April 8 and 1000 on July 24. Breeding reported in wall drains at Keynsham and Batheaston.

TREE PIPIT

Reports (32) of up to three on passage, April 4 to May 15 and August 8 to September 18, but six at Sand Point on April 4 and eight at SGW on September 5.

TAWNY PIPIT

One, CVL, October 2 (NAL, AFS) - first for Avon. [BBRC]

ROCK PIPIT and WATER PIPIT

Reports (63), mainly from coast and reservoirs, of up to eight, January

1 to April 10 and October 6 to December 12; about half the birds reported in each period were Water Pipits, and one bird at Oldbury-on-Severn on October 6 showed characteristics of the race *A. s. littoralis* (AJM). One or two Rock pipits regularly noted during the summer at Wain's Hill, Clevedon.

YELLOW WAGTAIL

Reported in small numbers (up to 13) in every month from April 10 to October 23, mainly from coast and reservoirs, but 100 in one flock at CVL on August 21. Breeding season reports from seven sites (see page 46).

PIED WAGTAIL and WHITE WAGTAIL

The only winter roosts reported were of 500 in Southgate, Bath and of c. 40 in Nailsea, but flocks of up to 60 were noted at CVL on March 12 and September 28, and of 30 at Abbots Leigh on November 6. In April and early May, up to three White Wagtails were noted on Severnside, at Bucklands Pool and Barrow Gurney Reservoirs, up to 14 at CVL, one or two on coast near Clevedon and one at Sand Point.

DIPPER

Records of one or two in all months, chiefly on the Wellow, Cam and Midford Brooks in SA. Breeding proved in NA at Willsbridge and in SA at Shockerwick, Monkton Combe, Freshford, Midford, Combe Hay, Dunkerton, Writhlington, Camerton, Radford, High Littleton and Hallatrow. This unusually high number of breeding records is the result of an intensive study by Priston Ringing Group and KFB.

WREN

One ringed in its first year on Steep Holm, August 16, 1981 was killed by a cat at Crétile, east of Paris, France on July 18, 1982 (AJP). Numbers depressed following cold winter.

NIGHTINGALE

Singing males reported from April 23 to May 26, in NA mainly from ST78, wher at least 25 noted in May (at Midger Wood, Assley Common, Inglestone Common area, Lady's Wood and Horton Bushes); also at Kelston (2) and Elberton nr Olveston; and in SA at Knowle and Stockwood (Bristol), Saltford (2), Odd Down, Combe Hay (3) and Cleaves Wood.

BLACK REDSTART

Reports of one at Sand Point, January 15 to March 27 and of one or two, October 31 to end of year, at Severnside, Portbury, Clevedon, Sand Point, Sand Bay and Lower Langford.

REDSTART

Up to three noted on migration, April 8-22 (16 reports) and July 28 to October 22 (15 reports). One possible breeding record: bird noted at Black Rock near Publow on May 15, June 5 and July 4.

WHINCHAT

No proof of breeding, but reports of up to four on passage, April 20 to May 11 and July 11 to October 4. One near Hewish on December 3 (BR) - latest known date.

STONECHAT

Only 21 records received, cf. 73 in 1980 and 75 in 1981. No reports during breeding season.

WHEATEAR

Noted on passage, mainly on coast, from March 18 to May 28 (44 reports, max. 7 birds) and July 2 to October 31 (69 reports, max. 16).

RING OUZEL

Six noted at Sand Point, April 4 and one at Stockwood, Bristol on the 6th.

FIELDFARE

Present up to May 8 (73 reports of flocks up to 450) and in smaller numbers from October 2 onwards (34 reports of up to 150).

REDWING

Reports (51) up to April 3 and (69) from October 7, in smaller numbers than usual. The only large flocks noted were 511 at Aust on January 6; 325 at Rockhampton on February 21; 300 at Bagstone on March 12; 140 at Clevedon on October 24 and 205 at Kingston Seymour on December 26.

CETTI'S WARBLER

One ringed at CVL, December 29 (CVRG) - second for county.

GRASSHOPPER WARBLER

Singing males, April 20 to July 19, in NA at Inglestone Common and Severnside, and in SA in the Gordano Valley, at Bleadon, CVL and Cleaves Wood; also (from dates, perhaps on passage) at Yeo Estuary, Sand Point, High Littleton, Saltford and Freshford.

REED WARBLER

Breeding proved in NA at Littleton Pits and Chittening Warth, and in SA at Nailsea Moor and CVL. At latter, 56 nests found, of which four contained Cuckoo eggs. Of 88 ringed at Littleton, 42 were birds of the year; one ringed there in 1976 has been retrapped annually except in 1979.

WHITETHROAT

Breeding proved in 17 one-km squares, and species noted during breeding season in a further 45 (PJC).

BLACKCAP

Records (248), covering all months, with exceptionally high number during very cold January and in February. A total of 308 apparently different birds was reported during the 1981-82 winter; the highest total was 47 on January 10.

WOOD WARBLER

Singing males noted, April 22 to June 2, in NA at Savage's Wood, Patchway and in SA at Leigh Woods (2); Barrow Wood, Brockley Combe (2), Mendip Lodge Wood and Weston Woods - single birds unless otherwise stated.

FIRECREST

Reports with confirmatory details of single birds, in NA near Thornbury (March) and at Over (November) and in SA at Keynsham (January), Saltford (December), Bleadon (December) and Christon (December). Single birds ringed, Steep Holm (Oct.), at Barrow Gurney (Oct.) and CVL (Dec.). Singing male at one site from April to June.

PIED FLYCATCHER

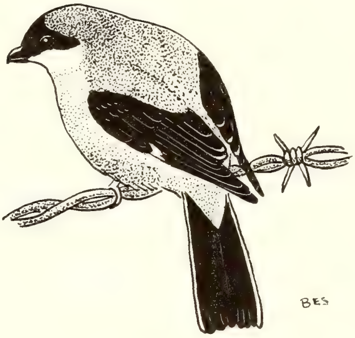
Single birds noted on passage, April 12 to May 7 and August 7 to September 5, at Leigh Woods, Cadbury Camp, Clevedon, Sand Point, Saltford and Odd Down, Bath; also four at Clevedon, April 20.

WILLOW TIT

Reports with confirmatory details of one, sometimes two, in NA at Inglestone Common, Dunkirk and by county border near Colerne; and in SA at Weston Woods.

LESSER GREY SHRIKE

One at Portbury Wharf, May 15 (GJU, KEV, GY *et al*.). First record for county. [BBRC]



GREAT GREY SHRIKE

One at Filton Golf Course, November 26 (RA).

RAVEN

NA Pair nested at a traditional site in April (AJM). Two adults seen with two juveniles at Hill on May 10.

SA One in flight over SGW, October 9.

ROOK

The only remaining Bristol rookery, at Shirehampton increased to six nests (three in 1981).

STARLING

No data on long-standing roost in Temple Meads area of Bristol or on new one in Corn Street; c. 700 in Union Street and c. 250 in Haymarket on December 11.

BRAMBLING

Reports (73) of single birds or small numbers from eleven NA and 20 SA localities, up to April 13; largest flock: 110 at Old Sodbury, January 4. Only two reports from NA and seven from SA, October 17 onwards, with maximum count of five.

SISKIN

Numerous reports, up to April 15 and from September 22 of single birds and small parties; the only large flocks were of 96 at Saltford, 50 at Keynsham and 50 at CVL, all in January.

TWITE

Parties of up to eleven reported, January 18 - March 13 and December 11-21, from Severn Beach in NA and Portishead in SA.

REDPOLL

Sixty reports of single birds and small parties, up to May 16 (max. 13

on March 16) and from October 23 onwards (max. 10, December 11-12). Flock of 40 at Abbots Leigh, December 2.

CROSSBILL

Single birds seen at Winscombe in June (BR) and Stoke Bishop, Bristol on November 14 and 21 (NTL).

HAWFINCH

SA For the first time for 20 years none noted at Cadbury Camp (HSW) but a pair bred successfully in Leigh Woods.

SNOW BUNTING

Single birds at Severn Beach on March 24, and at New Passage, Filton SGW, Yeo Estuary and Sand Point in October and November; two at New Passage, late October.

YELLOWHAMMER

Breeding season records from 133 one-km squares, cf. 172 in 1981 (NB. less time spent recording - PJC). Winter flocks of 30-40 noted in NA at Old Sodbury, Wick, Marshfield and Doynton; also 87 on Hinton Hill and 70 at Brockham End, Lansdown in December.

CIRL BUNTING

No records obtained during BTO Breeding Survey.

CORN BUNTING

NA Total of 55 singing males, March 22 - August 1, in areas of Hillesley - Dunkirk - Horton; Old Sodbury - Tormarton - West littleton - Marshfield; and Lansdown. Winter flocks: 113 and 40 near Marshfield on Feb. 21.

SA One on coast near Clevedon, October 3.

OTHER RESIDENT OR COMMONLY-OCCURRING SPECIES PRESENT

(Those marked * are referred to in the Introduction)

Pheasant, *Swallow, *House Martin, *Meadow Pipit, Grey Wagtail, *Wren, *Dunnock, *Robin, *Blackbird, *Song Thrush, Mistle Thrush, *Sedge Warbler, Lesser Whitethroat, Garden Warbler, Chiffchaff, Willow Warbler, *Goldcrest, Spotted Flycatcher; Long-tailed, Marsh, Coal, *Blue and *Great Tits, Nuthatch, Treecreeper, Jay, Magpie, Jackdaw, Carrion Crow, House Sparrow, Tree Sparrow, Chaffinch, Greenfinch, Goldfinch, Linnet, *Bullfinch and Reed Bunting.

ESCAPED, HYBRID and RELEASED BIRDS

SWAN GOOSE	One, Saltford, March 30 - April 8; four, CVL, April 17 into 1983, on December 29.
SNOW GOOSE	CVL: two, January 14-20; 17, October 14 to end November; 18 in December.
CACKLING GOOSE	One, CVL, September 25 - October 31.
RUDDY SHELDUCK	Female, CVL, July 18 into 1983. (A Red-breasted Merganser and a female Scaup appeared on the coast the same day - possibly all three were escaped

	birds).
WOOD DUCK	Single males, Tortworth Lake, January 3; Saltford, January 23-24; Victoria Park Lake, Bath, May 21; Eastville Park, Bristol, August 21 - October. Female shot, Litton Reservoirs, September 23.
RED-CRESTED POCHARD	Female on R. Avon, Hotwells, Bristol, January 18.
POCHARD x RED-BREASTED POCHARD	Male, Blagdon Reservoir, January 16.
TUFTED x POCHARD (Scaup type)	Female, CVL, March 20 - December 11.
TUFTED x POCHARD (Lesser Scaup type)	Male, Blagdon Reservoir, March 13, April 11; male CVL, April 17 - May 14; two males, CVL, June 5 and 12; one, June 26 - end July.
POCHARD TYPE HYBRID	Male, CVL, August 4-7 and Blagdon on 7th. Two males, CVL, September 25.
TUFTED TYPE HYBRID	Male, CVL, April 17 and May 1.
SCAUP	Two colour-ringed females, Bristol City Docks, January 17.
WHITE-HEADED DUCK x RUDDY DUCK	Male from 1981 at Blagdon Reservoir/CVL, January 6 - February 15.
COCKATIEL	One, Steep Holm, September 19.
RED AVADAVAT	One, CVL, July - August 15.

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AVON & DISTRICT ENTOMOLOGICAL REPORT, 1982

Compiled by the Recorders of the Entomological Section

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As the following accounts of the various insect orders will show, 1982 was a remarkable year for the number and variety of insects recorded in Avon and district. This impressive volume of records - by far the largest since this series of reports started in 1977 - was due not only to the abundance of insect life as a result of the very favourable weather in the spring and early summer but also to the mutual exchange of records between the Entomological Section and the Bristol Regional Environmental Centre (BRERC) at the City of Bristol Museum. Following discussions on computer storage of data now held by the recorders on cards, the Section and the BRERC will use the same species record card designed by the Records Centre. From 1983 this new record card will replace the existing Section's record card which has been in use for the last five years.

It would be helpful if all observers would use this new species record card for sending records to the recorders in preference to the old card or lists of records on sheets of paper which have to be copied on to the new cards, with risk of errors due to transcription. The use of four or preferably six figure grid references is essential on the species record card and observers should give the grid reference of the exact place the record was made and not a reference point in the centre of the site or locality. A record made at the periphery of a site could be several kilometres away from the grid reference given for the centre or access point of the site. To avoid repeating in full certain sites or localities which occur repeatedly in the report, and also to help members locate sites in Avon and district, designation of these sites and localities with grid references is given before the systematic list. This has been compiled with the BRERC and grid references refer to the centre of the site or locality and not the access point.

Two new recorders have joined the recording team - R.M. Payne who will be responsible for the *Hymenoptera* and L.S. Way has joined G.W. Sorrell and A.H. Weeks in looking after the butterflies. The recorders on behalf of the Entomological Section wish to thank the staff of the BRERC under the direction of Mrs A.J. Hollowell, Curator of Natural History at the City of Bristol Museum, for their invaluable help and guidance in initiating this joint venture of pooling insect data for storage and retrieval.

The area covered by this report is the county of Avon and adjacent localities of entomological interest in the bordering counties of Gloucestershire, Wiltshire and Somerset. Records from these latter counties are indicated by G, W or S respectively - all other records refer to Avon. Records are of single specimens unless otherwise stated.

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Non-members who contributed to the butterfly records through the BRERC Common Butterfly Survey will be acknowledged individually elsewhere.

WEATHER SYNOPSIS (Compiled by A.H. Weeks)

1982 was a year of strong contrasts. After the cold spell in January, the rest of the winter was very mild. There followed a warm spring and summer - in fact, in the whole year, only January's mean temperatures were lower than average, the other months being warmer by up to nearly 2°C. The thermometer rose into the '80s' (26°C) some time in every month from May to September, whereas in 1981 this occurred only in August. Rainfall was very variable, ranging from little more than one third of average in some months to well over double in others. The year ended just a little wetter than normal.

Few of us will easily forget the icy second week of January, when air frosts of down to about -15°C and ground frosts about -20°C were recorded in the county and snow lay up to 40 cm deep. However the rest of the month was so mild that the mean temperature was less than a degree centigrade below average. Precipitation amounted to between 70% and 90% and sunshine was also down at about 75% (the percentages given refer to the ratio of rainfall or sunshine to the long term average for the month in question). February was very mild, 1.5°C above average, dull at 80% and dry at 75-85%, whereas March was both mild and very wet (150-200%). Surprisingly, sunshine figures for the month were also up, in the range 125-130%. April and May were both warm and dry (40-50%), with above average sunshine (up to 118%). June was a month of widespread thundery activity: most of the storms were local, so that rainfall varied very much within a short distance, eg on the 2nd, 32 mm of rain fell at Tickenham in ½ hour and there was 12.5 mm diameter hail at Nailsea, while Yatton (from where the storm was both seen and heard) had nothing. Outside Avon, Wotton Bassett had 90.2 mm in 2 hours. There were also intense storms, also from noon onwards, on the 3rd (Lyneham, Wilts. had 36 mm in 40 minutes) and others on the 10th and 11th. On the morning of the 18th, 75 mm of hail covered part of north-east Bristol, with drifts up to 90 cm deep. Rainfall totalled 200% to 225%, but temperatures were 1.5-2°C up. Sunshine was about 90%.

July continued the pattern, warmer by 0.5 to 1°C, sunshine down at 80-90% and thundery rain which produced 110% in some places but as little as 40% in others. On the 12th, a violently active storm produced nearly 25 mm in the Bristol area but rainfall was much heavier further south (115 mm fell in 4 hours at Bruton). August was nearer normal as regards temperature, but the thundery activity continued, producing rainfall ranging from 67 to 110%. On the evening of the third a particularly storm swept from east to west across the middle of the county. Well over 25 mm fell at Yatton in about 40 minutes, the storm giving 36.1 mm in total. Sunshine was again below average at 75-85%. September brought a temporary improvement, with near normal sunshine, rain between 90 and 110% and temperatures again 1-1.5°C up, mostly because of a fine spell in mid-month. October brought further heavy rain, 130-140% in most places, but there was a strip along the Bristol Channel coast from just north of Clevedon to Bridgwater Bay which was less wet, some places having only 75%. In Avon, this area covered roughly the triangle enclosed by Clevedon, Blagdon and Weston-super-Mare. Temperatures were a little above average , but it was very dull, sunshine being well down at 65 -80%. November produced temperatures ranging between 1 and 2°C up, near normal sunshine but rain again in the region of 150%. December was yet another month with above average rainfall (120%) and low sunshine (90-95%).

The severe cold spell in the first half of January appears to have had no adverse effect on the lepidoptera populations. The subsequent warmth brought about an early emergence of most species and in some cases, such as the Small Tortoishell, a long breeding season and a succession of broods. The summer 'browns' (*Satyridae*) were affected by the severe storms. They had appeared on the wing early but they also disappeared early for in those areas in the path of the intense rainfall in the late evening of 3 August, very few survived, most presumably having been destroyed by the persistent torrential rain. It remains to be seen whether or not this curtailment of the breeding season will be reflected in lower population levels of 'browns' in 1983. There is little doubt, however, that observers of butterflies will look back at 1982 as a good year, with large numbers of insects and the reappearance, in more satisfying numbers, of fritillaries which were so scarce in 1981. At one site in the county, 25 species of butterfly were recorded within five days and 32 in the entire season. The total species for Avon was 43 compared with 39 in 1981.

DESIGNATION OF SITES AND LOCALITIES

v.c.34

Michael Wood, nr Stone (G)	ST 702 955
Midger Wood, Lower Kilcott, SSSI, GTNC/AWT Reserve	ST 795 895
Lower Woods, Wetmoor, nr Wickwar, SSSI, GTNC/AWT Reserve	ST 745 877

v.c.6

Ashton Park, nr Bristol	ST 555 720
Banner Down, nr Batheaston	ST 792 686
Blagdon Lake, nr Blagdon, SSSI	ST 515 595
Brean Down, nr Brean (S), SSSI, NT	ST 290 590
Brown's Folly, nr Bathford, SSSI, AWT Reserve	ST 794 660
Burrington Warren, nr Burrington, Mendip, SSSI	ST 480 585
Catcott Heath, nr Catcott Burtle (S)	ST 409 411
Chew Valley Lake, nr Chew Stoke, SSSI	ST 570 600
Chilton Moor, nr Chilton Polden (S)	ST 380 430
Crook Peak, nr Compton Bishop (S)	ST 387 557
Dolebury Warren, nr Churchill, SSSI, AWT Reserve	ST 455 588
Goblin Combe, nr Cleeve, AWT Reserve	ST 475 653
Hanham Woods, nr Bristol, SSSI	ST 636 710
Leigh Woods, nr Bristol (Forestry Commission)	ST 550 740
Leigh Woods, nr Bristol, National Nature Reserve	ST 550 730
Lord's Wood, nr Chelwood	ST 634 630
Middle Hope, nr Weston-s-Mare, SSSI, NT	ST 330 660
Priddy Mineries, nr Priddy, Mendip, (S), STNC Reserve	ST 547 515
Shapwick Heath, nr Shapwick (S), SSSI, NNR	ST 430 400
Tadham Moor, nr Wedmore (S)	ST 420 440
Velvet Bottom, nr Charterhouse, Mendip (S), STNC Reserve	ST 498 550
Walton Hill, nr Street (S)	ST 465 351
Walton Moor, nr Walton-in-Gordano	ST 433 727

Westhay Moor, nr Westhay (S), STNC Reserve	ST 453 437
Weston Big Wood, nr Portishead, SSSI	ST 455 750
Weston Woods, nr Weston-s-Mare	ST 325 626

BUTTERFLIES (Lepidoptera) by G.W. Sorrell, L.S. Way and A.H. Weeks

Records for 1982 were greatly increased in volume by many received from the Bristol Regional Environmental Records Centre (based in the City of Bristol Museum) who ran a butterfly survey this year. We are grateful for these records which show the presence in the county of Avon of the Wood White, (*Leptidea sinapis*), a further colony of the Duke of Burgundy Fritillary, (*Hemearis lucina*), and show that the other fritillaries are more widespread than was previously known. It was generally a good year. The sighting of the Large Tortoiseshell (*Nymphalis polychloros*) in Hartcliffe, Bristol in August 1981 (this Report, 1981) has been confirmed. Another sighting was made in Flax Bourton in July this year. The Camberwell Beauty (*Nymphalis antiopa*) seen in August was unlikely to have migrated here. It may have arrived on a ship from Scandinavia or have been bred and released by person unknown. A record of the Monarch Butterfly (*Danus plexippus*) seen in a garden at Abbots Leigh, nr Bristol in September, 1981 was received too late for inclusion in the 1981 Report. The invasion of the Monarch into the British Isles in late September and early October, 1981 has been documented by Bretherton and Chalmers-Hunt (1982). The scientific and vernacular names, also the order of species, follow those given in the checklist by Higgins and Riley (1975).

Pieris brassicae (Large White) Common throughout the county; noted from 18 April to 10 October.

Pieris rapae (Small White) Common; noted from 27 March to 10 October.

Pieris napi (Green-veined White) Quite common; noted from 20 April to 19 September; most frequent in May and late July-August. Maximum of twenty, Goblin Combe, 29 July.

Anthocharis cardamines (Orange Tip) Widespread over the county but never in large numbers; noted from 8 April to 13 June.

Colias crocea (Clouded Yellow) Single specimens seen near Winscombe, 5 September and Alveston, 17 September.

Leptidea sinapis (Wood White) Reported near Hawkesbury Upton, 7, 8 June.

Gonepteryx rhamni (Brimstone) Earliest report, single male, Horfield, 9 February; main emergence, 22 March, flying until late June; new brood last recorded 11 August. Largest numbers 15, Goblin Combe, 20 April; 13, Crook Peak, S, 9 May; 11, Goblin Combe, 10 May.

Ladoga camilla (White Admiral) Two, Shapwick, S, 26, 27 June; a few, Wetmoor, G, 19 July and Michael Wood, nr Stone, G, 19 July: Butleigh Moor, nr Street, S, 30 June to 16 July; one, Westonbirt, G, 19 July.

Inachis io (Peacock) First recorded 2 and 22 March; main emergence from mid-April, largest numbers 15, Goblin Combe, 20 April. New brood large, from mid-July; 29, Congresbury, 25 July; over 25, Goblin Combe, 29 July; over 50, Filton, 4 August and over 100, Lower Kilcott, 4 August. Last seen on the wing, 23 October.

Vanessa atalanta (Red Admiral) First seen 15 and 18 April. Main flow of immigrants late May, apparently producing two further broods, for species was frequent from late July; last noted 11 November. Maximum numbers noted, over 20, Lower Kilcott, 4 August and 17, Filton, 17 September.

Nymphalis antiopa (Camberwell Beauty) One, basking on wall of building, Park street, Bristol, 27 August, seen by NL who has supplied full details.

Nymphalis polychloros (Large Tortoiseshell) One in garden, Flax Bourton, 22 July - detailed description supplied by MJ.

Vanessa cardui (Painted Lady) First noted 15 May; widespread in small numbers from late July, last noted 23 October. Maximum of ten, Congresbury, 23 August.

Aglais urticae (Small Tortoiseshell) First seen, 9 February, Yatton; 5 March Congresbury, with 32, same village, 27 March. Extremely successful subsequent generations on wing late June to late October; last individual seen 10 Nov. Maximum over 150 by river nr Bath, 28 August and c. 250, Shirehampton, Bristol, 5 October.

Polygonia c-album (Comma) Widespread from 23 March in small numbers. Maximum recorded, seven Goblin Combe, 10 May; Iwood, nr Congresbury, 18 July; 9, Goblin Combe, 13 September and last seen 24 October.

Argynnis pathia (Silver-washed Fritillary) Small numbers over a wide area from Shapwick, S, to Michael Wood, nr Stone, G, from late June to late August. Maximum seen in one locality, three, Goblin Combe, 10 August.

Mesoacidalia aglaja (Dark Green Fritillary) Thinly but widely distributed. Four, Dolebury Warren, nr Churchill, 17 July; five, Midger Wood, 18 July; others Sand Point, Goblin Combe, Brean Down, S, Wellow, Street, S, and Wotton-under-Edge, G.

Fabriciana adippe (High Brown Fritillary) Single, Velvet Bottom, nr Charterhouse, S, 25 July.

Clossiana euphrosyne (Pearl-bordered Fritillary) Not at all numerous. Two, Cleeve, 11 May; singles, at same site, 10 May; Cheddar, S, 30 May; Brockley, 2 June; Headley Park, Bristol, 29 May to 9 June.

Clossiana selene (Small Pearl-bordered Fritillary) Two, Charterhouse, S, 4, 13 June; four, Dolebury Warren, nr Churchill, 12 June; also Priddy, S, 24, 25 June.

Euphydryas aurinia (Marsh Fritillary) Seven, Charterhouse, S, 4 June; and two, same site, 13 June; singles at Midger Wood, 28 May; Priddy, 12 June; near Wickwar, 18 August. One vagrant in garden, Coalpit Heath, nr Bristol, 30 May.

Melanargia galathea (Marbled White) Widespread an numerous from 16 June to 3 August.

Hipparchia semele (Grayling) Frequent in a few colonies, 8 July to 22 Aug. Maximum numbers recorded, thirty, Crook Peak, S; over forty, Goblin Combe, 19 to 24 July; others at Burrington Combe, Brean Down, Clevedon, Dolebury Warren, Middle Hope and Uphill.

Maniola jurtina (Meadow Brown) Single early emergence, Henleaze, Bristol, 31 May. Main flight plentiful and widespread, 12 June to end of August; last seen Dolebury Warren, 15 September, Goblin Combe, 18 September.

Aphantopus hyperantus (Ringlet) Locally plentiful. First seen, Burrington, 17 June. Estimated one thousand in area near Dodington, 11 July; over 50, Goblin Combe, 8 and 19 July; Dolebury Warren, nr Churchill, 17 July and Lower Kilcott, 4 August. Last seen, 29 July.

Pyronia tithonus (Gatekeeper) Locally abundant, especially in South Avon. First record, Congresbury, 20 June. Largest numbers noted from mid-July to mid-August, including over 200, Crook Peak, S, 22 August; over 50, Burrington, Congresbury, Conham, Bannerdown, Dolebury Warren, Goblin Combe, various dates. Last seen, 28 August at Sea Mills and Yatton.

Coenonympha pamphilus (Small Heath) Less numerous than in recent years, but widespread. First record, Burrington, 13 May; maximum numbers noted, over 50, Dolebury Warren, nr Churchill, 17 July; Goblin Combe, S, 19 July. Last seen 15 September at Dolebury Warren.

Pararge aegeria (Speckled Wood) First seen, 15 April, Goblin Combe. Numbers remained small until June, when species became numerous and widespread. Highest recorded numbers, over 50, Dodington, 6 June; over 20, Goblin Combe, 29 July, 10 August and 13 September. Last noted, Goblin Combe, 23 October.

Lasiommata megera (Wall Brown) Recorded, nearly always in small numbers, widespread over South Avon. First noted, 7 May, Goblin Combe and last, 3 October, Cheddar Reservoir, nr Axbridge, S.

Hamearis lucina (Duke of Burgundy Fritillary) Recorded in Avon only at Midger Wood, Lower Kilcott - one, 3 May and two, 23 May; several 28 May: and at Cleaves Wood, nr Wellow in May; two at Great Breach Wood, Compton Dundon, nr Street, S, 29 May.

Thecla betulae (Brown Hairstreak) One Walton Hill, Street, S, 15 August.

Quercusia quercus (Purple Hairstreak) One, Shirehampton, Bristol, 17 July and 11 August; Michael Wood, nr Stone, G, 19 July; Frocester Hill, nr Dursley, G, 22 July; Cleeve Toot, 24 July; Midsomer Norton, 25 July; Hanham, Bristol, 1 August; Goblin Combe, 10 August and Walton Hill, Street, S, 15 August.

Strymonida w-album (Whiteletter Hairstreak) Goblin Combe, 24, 29 July.

Callophrys rubi (Green Hairstreak) Widespread but thinly populated; noted from 10 May to 15 June at Goblin Combe (maximum number, four on 10 May); also at Dolebury Warren, Midger Wood, nr Kilcott, Iron Acton, Weston-in-Gordano, Wellow, Tresham, nr Wotton-under-Edge, G; also Crook Peak, S, Charterhouse, S and Priddy, S.

Lycaena phlaeas (Small Copper) Recorded over whole county, mostly in small numbers. First seen, 13 May, Burrington; last, 10 October. Highest numbers, 15, Burrington, 26 July; 12, Velvet Bottom, S, 17 July and ten, same place on 25th.

Aricia agestis (Brown Argus) Fairly widespread in small numbers. First seen 14 May, Dolebury Warren; last, 14 September, Burrington. Highest numbers, eight, Goblin Combe, 27 May and five, same site, 11 August.

Cupido minimus (Small Blue) Uphill, 31 May to 10 July. Maximum number, c.90, 5 June; also Dolebury Warren, 12 June; Worlebury, 13 August; Hammoth Hill, nr Hillesley, 28 July.

Plebejus argus (Silver-studded Blue) Compton Dundon, nr Street, S, 27 August (unconfirmed report).

Celastrina argiolus (Holly Blue) Very small numbers at widely separated sites. First brood, 25 April at Goblin Combe to 15 May, Coalpit Heath, Frampton Cotterell, nr Bristol. Summer brood more in evidence, 24 June, Ashton Park, Bristol to 13 August, Worlebury and noted at Westbury-on-Trym and Kings Weston, Bristol, July and August.

Lysandra coridon (Chalk-hill Blue) In good numbers, Midger Wood, Lower Kilcott, 18 July; Brean Down, S, 24 July, Banner Down, nr Batheaston, 9 Aug. Also at Ebbor Gorge, nr Westbury-sub-Mendip, S, 4 August; Uphill, 9 August; Hatch Hill, Street, S, 15 August and at Hammoth Hill, Hillesley; Compton Dundon, S and Rodborough, nr Stroud, G.

Polyommatus icarus (Common Blue) Fairly widespread in moderate numbers. First seen, Dolebury Warren, 14 May; last, same site, 15 to 18 September. Highest numbers noted, over 50, Conham, Bristol, 24 July; 30, Banner Down, 9 August; 26, Burrington, 10 August.

Pyrgus malvae (Grizzled Skipper) Early emergence, Rowberrow, nr Shipham, S, 18 April and Dolebury Warren, 27 April; seven at same site, 28 April and four, 14 May; three, Goblin Combe, 7 May, eleven, 10 May and three, 27 May. Small numbers at Crook Peak, S, 9 May and Burrington, 13 May. Unusual reports of several seen at semi-urban sites near mouth of Avon (Royal Portbury Dock and Avonmouth North Pier).

Erynnis tages (Dingy Skipper) Three, Burrington Common, 13 May; ten, Dolebury Warren, 14 May; one, Midger Wood, 23 May; five, Goblin Combe, 27 May and two, 29 May. Others at Crook Peak, S, Filton, Little Sodbury and Cleaves Wood, Wellow.

Thymelicus sylvestris (Small Skipper) Noted from 17 June to 15 August over wide area. Largest numbers, over 50, Midger Wood, Lower Kilcott, 18 July and Velvet Botton, S, 25 July; over 40, Berrow, S, 10 July; Dolebury Warren 17 July and Goblin Combe, 19 July.

Thymelicus lineola (Essex Skipper) Two, Frocester Hill, nr Dursley, G, 22 July and one, Middle Hope, nr Weston-s-Mare, 28 July (photographed).

Ochlodes venatus (Large Skipper) Recorded from 29 May to 10 August in reduced numbers. Largest numbers over 50, Velvet Bottom, S, 17 July; 24, Uphill, 5 June; and in urban surroundings, 20 at Wedmore Vale, Bristol on 10 August and Henleaze, Bristol, 26 June. Others at Shapwick, S; Midger Wood, Lower Kilcott; Goblin Combe; Dolebury Warren; Burrington; Bleadon, S; Failand; Leigh Woods, nr Bristol and Winscombe.

MOTHS (Lepidoptera) by K.H. Poole

After several rather poor years for moths 1982 showed some improvement.

A number of migrants were recorded - notably the Humming Bird Hawk, also the Convolvulus Hawk, Bordered Straw, the usual Silver Y and the easily overlooked Ni Moth. Other interesting records were of the Scarlet Tiger in Leigh Woods, both larva and moth, - a first for this area; Alder Moth larvae, not often seen; Buff Footman at Brockley Combe, only previously seen in Goblin Combe in 1960, and Satin Carpet at Priddy and Weston-super-Mare. Several more records for Blair's Pinion seem to indicate that this moth (first noted in Britain in the 1950's) is now becoming established in our district. The Clouded Magpie and Blomer's Rivulet, both Elm feeders, continue to appear. The Privet Hawk was again reported from Bristol, and has reappeared at Weston-super-Mare after an apparent absence of several years.

Names are in accordance with Kloet and Hincks *A Check List of British Insects*, Vol. XI, Pt. 2, 2nd ed, 1972.

Sphinx ligustri L. (Privet Hawk) Weston-super-Mare, 13 June (CSHB); Filton, Bristol, 21 June, 25 August (LW); Bedminster, Bristol, 1 September (NL); Warmley, 17 August, larva (PB).

Agrius convolvuli L. (Convolvulus Hawk) One, Hutton and two, Locking, nr Weston-super-Mare, end of October/early November (EAFD).

Acherontia atropos L. (Death's Head Hawk) Pupa, Weston-super-Mare, September (EAFD).

Macroglossum stellatarum L. (Humming Bird Hawk) Weston-super-Mare, late July/August (CSHB); Brean Down, S, 17 July (RA); Bristol, 26 July - 29 September, (several records, including one for 1981).

Harpyia furcula Cl. (Sallow Kitten) Chew Valley Lake, 30 July (HKB) and Congresbury, 30 July, 5 August (GWS).

Ptilodon capucina L. (Coxcomb Prominent) Congresbury, 16 May (RWR); 23 July (GWS).

Tethea ocularis L. (Figure of Eighty) Knowle, Bristol, 9 June (HKB).

Saturnia pavonia L. (Emperor) Congresbury, 18 April (GWS).

Drepana cultraria Fab. (Barred Hook-tip) Hutton, nr Weston-super-Mare, 30 July (KHP).

Pseudoips bicolorana Fuess. (Scarce Green Silver Lines) Hutton, nr Weston-super-Mare, 30 July (KHP).

Callimorpha dominula L. (Scarlet Tiger) Larva, Leigh Woods, (FC), nr Bristol, 10 April and imago, same place, 10 July (GWS).

Arctia villica L. (Cream Spot Tiger) Worle, Weston-super-Mare, 20-24 May, (EAFD).

Eilema deplana ESp. (Buff Footman) Brockley Combe, 14, 20 July (CSHB).

Acronycta alni L. (Alder) Banner Down, 9 August, larva (GWS); Barton, nr Winscombe, larva on cherry plum (PV).

A. leporina L. (Miller) Catcott, 26 May (HKB).

Agrotis puta Hb. (Shuttle-shaped Dart) Knowle, Bristol, 23 October (HKB).

Anaplectoides prasina Schiff (Green Arches) Priddy Forest, 6 July (KHP).

Celaena leucostigma Hb. (The Crescent) Berrow, S, 23 July, (HKB).

Apamea furva Schiff (The Confused) Weston-super-Mare, 21 June, (CSHB).

A. scolopacina Esp. (Slender Brindle) Several, Weston-super-Mare, July, (CSHB); Brockley Combe, 14 July (KHP).

Coenobia rufa Haw. (Small Rufous) Westhay, S, 6 August (HKB) and Street, same date, (KHP).

Mythimna obsoleta Hb. (Obscure Wainscot) Berrow, S, 30 June (CSHB).

Hopiodrina ambigua Schiff (Vine's Rustic) Weston-super-Mare, 26 May - an early date - possibly a migrant (CSHB).

Heliothis peltigera Schiff (Bordered Straw) Congresbury, 17 July (GWS).

Lithophane semi-brunnea Haw. (Tawny Pinion) Weston-super-Mare, 19 December (EAFD).

L. leautieri Boisd. (Blair's Pinion) Weston-super-Mare, 7 October (CSHB); Chew Magna, 8 October (AH) and Knowle, Bristol, 21, 25 October (HKB).

Cucullia chamomillae Schiff (Chamomile Shark) Shapwick, S, 26 June, larvae, (HKB & GWS).

Scoliopteryx libatrix L. (The Herald) Steep Holm, 8 May, several in underground batteries (RSC); several localities on Mendip, in caves and tunnels, during winter months (RSC).

Tricholusia ni Hb. (Ni Moth) Weston-super-Mare, 17 September (CSHB) and Knowle, Bristol, same date, (HKB).

Plusia festucae L. (Gold Spot) Chew Valley Lake, 30 July (HKB) and Shapwick, S, 15 September (CSHB).

Catocala nupta L. (Red Underwing) Winscombe, 5 September (PV).

Archiearis parthenias L. (Orange Underwing) Brockley Combe, 27 March (HKB).

A. notha Hb. (Light Orange Underwing) Wetmoor, S, 14, 19 April, (HKB).

Lobophora halterata Hufn. (The Seraphim) Knowle, Bristol, 12 May (HKB).

Perizoma bifasciata Haw. (Barred Rivulet) Weston-super-Mare, 26 July (CSHB).

Triphosia dubitata L. (The Tissue) Congresbury, 23 July (GWS); Mendip - several localities, in caves and tunnels, during winter months (RSC).

Lampropteryx otregiata Metcalfe (Devon Chevron) Shapwick, S, 27 May (KHP).

Discoloxia blomeri Curt. (Blomer's Rivulet) Weston-super-Mare, 20 May - 23 July (CSHB) and Hutton, nr Weston-super-Mare, 30 July (KHP).

Eupithecia indigata Hb. (Ochreous Pug) Weston-super-Mare, late May (CSHB).

E. trisignaria H.S. (Triple-spotted Pug) Berrow, S, 30 June (CSHB).

E. denotata Hb. (Campanula Pug) Weston-super-Mare, 9 June (CSHB).

E. intricata Zett. ssp. *arceuthata* Fr. (Freyer's Pug) Weston-super-Mare, 5, 19 June (CSHB) and Knowle, Bristol, early June, very common (HKB).

E. satyrata Hb. (Satyr Pug) Midger Wood, Lower Kilcott, 28 May (HKB).

Abraxas sylvata Scop. (Clouded Magpie) Several, Weston-super-Mare, June-July (CSHB); Brockley Combe, 14 July (KHP); Hutton, nr Weston-super-Mare, 30 July (KHP) and larva, same place, 12 August (GWS).

Deileptenia ribeata Cl. (Satin Carpet) Weston-super-Mare, 15 July (CSHB) and several, Priddy, 20 July (KHP).

Semiothis wauaria L. (V Moth) Knowle, Bristol, 8 July (HKB).

Hepialus hecta L. (Gold Swift) Priddy, 6 July (KHP).

H. fusconebulosa Deg. (Map-winged Swift) Priddy, 6 July (KHP).

1981 REPORT - CORRECTION

X. rhomboidea Hb. (Square-spotted Clay) - this entry should be deleted.

BEETLES (Coleoptera) by R.W. Rowe

If 1982 was encouraging for an increase in the number of people sending in records, it was not notable for the number of rare beetles seen, although the following list will show that some quite interesting species were observed. It is also encouraging to find that records have been received from more 10 km squares than previously. The nomenclature followed is that given in Kloet and Hincks, *A Check List of British Insects*, Vol. XI, Pt. 3, 2nd. ed, 1977.

Limnobaris pilistriata Steph. Swept from vegetation, saltmarsh, Berrow, S, 16 July (RSC). Not recorded by Wilson (1958) in his *Coleoptera of Somerset*.

Clytus arietus L. (Wasp Beetle) Searching sawn trunk of tree in wood, Dodington, 6 June (RHP) and in garden, Burnham-on-Sea, S, 9 June (RSC).

Donacia clavipes Fab. One in grassland, Bleadon, 29 May (RSC).

Lampyris noctiluca L. One glowing on path, Compton Bishop, S, 13 July and also at base of Crook Peak, nr Compton Bishop, S, on 20th (RSC).

Apion urticarium Herbst. On nettles, Bleadon, 29 May (RSC).

Phytodecta pallida L. On low vegetation, Long Wood, nr Charterhouse, S, 25 April (RSC).

Pogonochaerus hispidus L. On vegetation beside garden, Congresbury, 18 May, (RWR).

Melontha melontha L. Came to light trap, garden, Congresbury, 31 May (RWR).

Cychrus rostratus L. One under a stone eating a snail, on scree slope beneath yews, Goblin Combe, 6 August (PC).

Ilybius aenescens Thomson Priddy Pools, Mendip, S, 11 August (RSC).

Dascillus cervinus L. Velvet Bottom, nr Charterhouse, S, 3 July (GWS).

Timarcha coriaria Laicharting (Small Bloody Nose Beetle) In grass, Charterhouse, S, 21 May (RWR).

Selatosomus incanus Gyllenhal One swept from roadside vegetation, Priddy, Mendip, S, 6 June (RSC). According to Wilson (1958) this beetle is not common in the southern counties.

Chrysolina violacea Müller Velvet Bottom, nr Charterhouse, S, 17 July (GWS). Apparently very local but known to be found on Mendip.

Cicindela campestris L. Several on tow path, R. Avon, Leigh Woods NNR, 22 April (RSC).

Niptus hololeucus Faldermann In house, probably from damp wood behind bath, Redland, Bristol, 3 August (EM).

Silpha tristris Illiger On mat inside front door of office, Temple Way, Bristol, 4 October (RWR).

Tychius melilotus Stephens Several on yellow melilot (*Melilotus altissima*) Saltford, 24 June (RSC).

COCCINELLIDAE (Ladybirds)

Anatis ocellata L. (Eyed Ladybird) One, Blaise Castle, Bristol (per LSW - BRERC). Photograph and full details supplied of this local ladybird. This is the first record of this species in the area since this series of Reports started in 1977.

Chilocorus renipustulatus Scriba On post, Leigh Woods (FC), nr Bristol, 27 March (RHP) and pupa found on leaf of ash, same place, 10 July (Ent. Sect.).

Coccinella 11-*punctata* L. Burnham-on-Sea, 10 March (RSC); Congresbury, 27 March (RWR) and on river bank, Sea Mills, Bristol, 19 April and 16 May (RHP) - a local species with a preference for saltmarsh habitats.

Halzia 16-*guttata* L. Shapwick, S, 26 June (GWS) - another local species.

DAMSELFLIES & DRAGONFLIES (Odonata) by A.R. Nichols

Eleven members sent in a record number of observations on 22 species of *Odonata* - the largest number of species recorded in a single year for Avon and district since this series of reports started in 1977. In this period 23 species have been noted as occurring in the area and the only one not recorded in 1982 was the Keeled Skimmer, *Orthetrum coerulescens*, last seen in 1979. Not only was the variety of species remarkable but the number of dragonflies was exceptional throughout the area. One notable example was the Emperor Dragonfly, *Anax imperator*, which is recorded at the most in two or three localities but in 1982 it was reported from ten.

The data on dragonfly distribution so far collected since 1977 is now sufficient to warrant a more detailed analysis with the possibility of producing a series of distribution maps based on 10 km squares. If members have records of even the commoner species they have not sent in previously, these would be of value especially from the north and east of the county.

The vernacular and scientific names used, also the order of species, follow the systematic list given by Hammond (1977).

Zycoptera (Damselflies)

Platycnemis pennipes Pallas (White-legged Damselfly) Several, Saltford, 24 June (RSC). Although outside the area covered by this Report, seen further up the R. Avon at Bradford-on-Avon, 10 July (JMT). Hammond (1977) notes that this species is susceptible to even slight pollution.

Coenagrion puella L. (Azure Damselfly) Widely reported from 30 May to 2 September.

C. pulchellum van der Linden (Variable Damselfly) Larval skin, Tickenham Moor, nr Tickenham, 20 May (LSW); several, Axbridge, S, 23 May (RSC) and abundant, Congresbury, 8 June (LSW).

Enallagma cyathigerum Charpentier (Common Blue Damselfly) Twenty three, Congresbury, 13 June and over 30, same place on 20th (GWS). Abundant at Shapwick Heath, S, 26 June (GWS); Dodington, nr Chipping Sodbury, 11 July (RHP); Blagdon Lake and Priddy Pools, S, 1 August (JMT). Two males and a single female, Wildlife Reserve, Leigh Woods (FC), 10 July (RHP). Last noted at Priddy Pools, S, on 2 September (JMT).

Pyrrhosoma nymphula Sulzer (Large Red Damselfly) An unusually early record of one, Priddy Pools, S, 27 April (JR); abundant same place, 28 May and Lord's Wood, nr Chelwood, on 31st (JMT). Also recorded from Conham, Bristol; Congresbury; Winscombe and Shapwick Heath, S.

Ischnura elegans van der Linden (Blue-tailed Damselfly) Widespread and common; first noted 30 May and last recorded 2 September.

Lestes sponsa Hansemann (Emerald Damselfly) Priddy Pools, S, 1 August, 2 September (JMT); Clarken Combe, Ashton Park, nr Bristol, 29 August (JMT) and abundant, East Harptree, same date (RSC); Lord's Wood, nr Chelwood, 11 September (JMT).

Agrion splendens Harris (Banded Demoiselle) Several, Snuff Mills, Stapleton, Bristol, 6 June (JMT); several males, Bathampton, same date (NK), also at Congresbury on 8th (NK). Few, Saltford, 24 June (RSC); Conham, Bristol, 11 August and Dundas Aquaduct, nr Claverton, 30 August (JMT).

A. virgo L. (Beautiful Demoiselle) Male flying low over ground in a purposeful movement to the north-east during a thunderstorm, Southmead, Bristol, 3 June (RHP) - seen at close range and full details supplied. Several, Snuff Mills, Stapleton, Bristol, 6 June (JMT); Banner Down, nr Batheaston, 10 July (JMT) and five, Conham, Bristol on 24th (GWS).

Anisoptera (Dragonflies)

Brachytron pratense Müller (Hairy Dragonfly) Several, Axbridge, S, 23 May (RSC) and a single, Shapwick Heath, S, on 30th (JMT).

Aeshna cyanea Müller (Southern Hawker) Reported from 14 localities between

10 July and 3 October. Nymphs or larval exuvium identified at Blaise Castle, Henbury, Bristol, February and April, also at Priddy Pools, S, in April

A. grandis L. (Brown Hawker) Recorded from Shapwick Heath, S, 26 June (GWS); Snuff Mills, Stapleton, Bristol, 3i July (JMT); Wetmoor, S, 8 August and Dundas Aqueduct, nr Claverton on 30th (JMT); several, Priddy Pools, S, 2 September (JMT).

A. juncea L. (Common Hawker) Nymph, Blaise Castle, Bristol, 19 April (PB). Recorded from widespread localities between 1 August and 18 September with max. six, Charterhouse, Mendip, S, 18 September (GWS).

A. mixta Latreille (Migrant Hawker) Blagdon Lake, 1 August (JMT); female, Bleadon, S, 22 August (RSC) and one, Dundas Aqueduct, nr Claverton on 30th (JMT); several Lord's Wood, nr Chelwood, 11 September and one, Litton, same date (JMT). Last seen at Priddy Pools, S, 30 September (JMT).

Anax imperator Leach (Emperor Dragonfly) Nymph, Blaise Castle, Bristol, 19 April (PB). Shapwick Heath, S, 30 May and several, Lord's Wood, nr Chelwood, 31 May (JMT); pair, Clarken Coombe, Ashton Park, Bristol, 6 June (JMT); Banner Down, nr Batheaston, 10 July (JMT); several, dunes, Berrow, S, 11 July (RSC) and male, Dodington, same date (RHP). Several, Priddy Pools, S, 17 July (RSC) and single, Charfield (MCK). Also seen at Westonbirt, G, on 25 August (MCK).

Cordulia aenea L. (Downy Emerald) Two, Priddy Pools, S, 28 May (JMT).

Orthetrum cancellatum L. (Black-tailed Skimmer) Nymphal exuvium, Priddy Pools, S, 27 April (LSW). Two, Shapwick Heath, S, 30 May (JMT) and several, dunes, Berrow, S, 11 July (RSC).

Libellula depressa L. (Broad-bodied Chaser) Shapwick Heath, S, 26 June (GWS); noted as abundant at Lord's Wood, nr Chelwood, 30 May and also at Clarken Coombe, Ashton Park, Bristol, 6 June (JMT); single, Newton St. Loe, 31 May (JMT); three males, Dodington, 1 July (RHP) and single, Charterhouse, Mendip, S, 18 September (GWS).

L. quadrimaculata L. (Four-spotted Chaser) Nymph, Priddy Pools, S, 27 April (DW) and imagines abundant there on 28 May (JMT). Several, Shapwick Heath, S, 30 May; two, Lord's Wood, nr Chelwood, 31 May and single, Newton St. Loe, same date (JMT). Last seen at Priddy Pools, S, on 1 August.

Sympetrum sanguineum Müller (Ruddy Darter) Several, Blagdon Lake, 1 August (JMT); Congresbury, 10 August (GWS); common, Priddy Pools, S, 24 August (NL, LSW) and female, Limpley Stoke, 28 August (LSW).

S. scoticum Donovan (Black Darter) Several, Priddy Pool's, S, 17 July and noted as abundant, same place, beginning of August to end of September (NL, JMT). Common, East Harptree, 29 August (RSC).

S. striolatum Charpentier (Common Darter) Widespread and often abundant, in many localities throughout the area including coastal sites. First recorded 8 July and last seen 3 October.

CRICKETS & GRASSHOPPERS (Orthoptera) by K.W. Miller

Records were received for thirteen species of Orthoptera and the commoner species particularly were more plentiful than in recent years. The following list includes details of the more local Orthoptera selected from records contributed by eight members and additional material from the BRERC.

Stethophyma grossum L. (Large Marsh Grasshopper) Several singing males and three females, STNC Reserve, Westhay Moor, S, 12 September (RSC). This large grasshopper has become increasingly rare on the central Somerset moors due to drainage and peat cutting operations (Burton, 1981) and it is encouraging to learn that it is still surviving in this reserve.

Chorthippus albomarginatus Degeer (Lesser Marsh Grasshopper) Recorded from Middle Hope, nr Weston-super-Mare, 19 August (LSW).

Myrmeleotettix maculatus Thunberg (Mottled Grasshopper) A few singing males, Brean Down, S, 6 June (RSC).

Tetrix undulata Sowerby (Common Groundhopper) STNC Reserve, Charterhouse, Mendip, S, 21 August (LSW).

Conocephalus dorsalis Latreille (Short-winged Conehead) Two females and a male on sea aster (*Aster tripolium*), saltmarsh, river bank, Sea Mills, Bristol, 29 August to 12 September (RHP). The only published record of *C. dorsalis* in v.c. 34 is an unusual one of two found in a garden, Stoke Bishop, Bristol in 1962 approximately 1 km from this saltmarsh colony (Burton, 1981). It seems likely that these originated from a colony on the bank of the Avon.

Tettigonia viridissima L. (Great Green Bush-cricket) Portishead, 23 July (TF) and Crook Peak, nr Compton Bishop, S, on 30th (PC).

Metrioptera brachyptera L. (Bog Bush-cricket) Noted as plentiful, Westhay Moor, nr Westhay, S, 8 August (RSC). This flourishing colony of this very local cricket is probably the same one discovered in 1954 by J. Cowley and noted as a strong colony in subsequent years to 1976 (Burton, 1981).

Gryllotalpa gryllotalpa L. (Mole-cricket) An unconfirmed report of one found in a garden, Westbury-on-Trym, Bristol, by two schoolboys and reported to the BRERC, was investigated by LWS who interviewed the two young observers about their unusual find. Unfortunately the live specimen was not photographed or retained for identification when it was discovered in late July or early August. Their description fitted well with this distinctive species but because of its extreme rarity in the British Isles this record must be treated with considerable reserve. The nearest post-1961 records are for South Hampshire although there are older ones for Wilts., Dorset and Devon (Haes, 1979).

This very distinctive and almost extinct cricket is usually found in the vicinity of water where it burrows in the damp soil with its specially adapted fore-legs. On warm evenings they may come to the surface where the males can be found singing at the entrance to their burrows. They will also occasionally take to the wing although not very strong fliers. The song, which is characteristic and is produced by the males, consists of a long burst of subdued 'churring' noises and can be heard on warm evenings from mid-April well into summer (Ragge, 1965). Members with gardens in the region of the Trym valley might like to keep their eyes, and more importantly their ears, open for it on warm summer evenings.

TRUE FLIES (Diptera) by R.H. Poulding

The large increase in records received for 1982 was in part a reflection of the abundance of flies of the more popular families during the summer following the exceptionally warm spring, and also due to a welcome increase in members contributing observations or specimens for identification. Hover flies, *Syrphidae*, one of the more readily identifiable families of the larger diptera, were particularly numerous from late May to early September with the exception of the *Syrphini* which includes the usually common *Syrphus ribesii*, *S. vitripennis* and *S. corollae*. Larvae of the *Syrphini* are predominantly aphid feeders and population levels of imagines are related to previous aphid abundance similar to ladybirds (*Coccinellidae*) whose larvae are also aphidagous. Neither *Syrphini* or *Coccinellidae* were generally abundant in 1982. However *Volucella* species were much in evidence in June and July especially *V. pellucens* which was unusually numerous. Concentrations of up to 30 were reported for this large syrphid and information from other counties in the south-west confirmed the widespread abundance of this species - a remarkable record of 160 on bramble blossom was received from Devon.

R.M. Payne contributed a number of interesting records of the lesser known dipteran families particularly in the *Acalyptratae*. The status of many of the species in these families is limited to records made over 50 years ago and, although listed by Audcent (1948, 1949) as occurring in the district (mainly Bristol, v.c. 6 and v.c. 34), the relative abundance given is often based on only a few records. With an increasing interest in these often difficult Acalypterates , many species previously unrecorded or considered rare in Avon may well prove to be widespread and more abundant than previous published records suggest.

Scientific names and order of species are in accordance with Kloet and Hincks, *A Check List of British Insects*, Vol. XI, Pt. 5, 2nd ed., 1976.

Tipulidae - Crane Flies

Dictenidia bimaculata L. Newly emerged male, wood, Dodington, nr Chipping Sodbury. 1 June (RHP). An uncommon tipulid of damp woodland.

Stratiomyidae - Soldier Flies

Stratiomys chamaeleon L. Larvae collected from rhine, Westhay Moor, S, 18 April. Adult emerged 11 May (RSC). Considered rare by Audcent (1948). Larvae float on the water surface of ponds or still water in vegetation and hibernate in mud.

Sargus bipunctatus Scopoli One in garden, East Harptree, 4 October (RMP).

Tabanidae - Horse Flies

Haematopota pluvialis L. Common on coast, Sand Bay, 19 June, when up to six on observer at one time (GWS). More abundant in Avon than for several years and recorded from several new localities.

Dolichopodidae

Hydrophorus litoreus Fallén On mud, margin of Chew Valley Lake, 19 October (RMP). Not recorded by Audcent (1948) for the district but noted as occurring in Somerset and Gloucester by d'Assis Fonesca (1978) and not uncommon generally in the British Isles but difficult to catch on surface of water.

Syrphidae - Hover Flies

Epistrophe grossulariae Meigen Leigh Woods (FC), 22 August (DAL, ETL).

First record for this locality.

Xanthogramma pedissequum Harris Weston Woods, 18 July (DAL, ETL); Congresbury, 7 August (RWR) and Henleaze, Bristol, 21 August (RHP).

Chrysotoxum bicinctum L. Leigh Woods (FC), 27 June (RHP) and 22 August (DAL, ETL); Hallen, nr Bristol, 7 July (RHP); Shapwick Heath, S, 4 July (DAL, ETL); Weston Woods, 18 July (DAL, ETL) and East Harptree, 24 August (RMP).

Orthonevra splendens Meigen On fennel (*Foeniculum vulgare*), garden, East Harptree, 24 August (RMP).

Volucella inflata Fab. Leigh Woods (FC), 12, 26 June (RHP); Dodington, nr Chipping Sodbury, 20 June (RHP) and Weston Woods, 18 July (DAL, ETL).

V. zonaria Poda Male on bramble blossom, garden, Henleaze, Bristol, 26, 27 June (DAP, RHP) and female on ivy, nr Zoological Gardens, Clifton, Bristol, 6 September (ETL).

Sericomyia lappona L. Shapwick Heath, S, 4 July (DAL, ETL). There are no recent records of this local syrphid in the district.

S. silentis Harris Shapwick, S, 4 July (DAL, ETL) and one on spear thistle (*Cirsium vulgare*), East Harptree, 3 August (RMP).

Helophilus hybridus Loew. Dodington, nr Chipping Sodbury, 30 May (RHP); Shapwick Heath, S, 4 July (DAL, ETL) and Shirehampton, Bristol, 11 September (RHP).

Parhelophilus frutetorum Fab. Male, Dodington, nr Chipping Sodbury, 9, 30 May (RHP). Reported as rare by Audcent (1949).

P. versicolor Fab. Dodington, nr Chipping Sodbury, 27 May (RHP) and Shapwick Heath, S, 4 July (DAL, ETL).

Micropezidae

Calobata petronella L. In garden hedge, East Harptree, 20 June (RMP). Noted by Audcent (1949) as uncommon.

Heleomyzidae

Scoliocentra caesia Meigen Female, entrance to badger sett, Stoke Woods, Rodney Stoke, nr Cheddar, 11 July (RMP). Only two records given by Audcent (1949) and noted as of rare occurrence in the British Isles by Collins (1943)

Sphaeroceridae

Limosina heteroneura Haliday On compost heap, East Harptree, 24 January (RMP). Single record given by Audcent (1949) at Bristol in 1927.

Gasterophilidae - Horse Bot Flies

Gasterophilus intestinalis Degeer Female ovipositing on flanks and belly of horse, Hallen, nr Bristol, 7 July (RHP).

Tachinidae

Tachina grossa L. On hogweed (*Heracleum sphondylium*), Priddy, 3 July (RMP). One of the largest tachinids in the British Isles, *T. grossa* is uncommon in Avon but more frequent in counties to the south-west.

Anthomyiidae

Paregle cinerella Fallén. One in garden, East Harptree, 31 July (RMP). Audcent' (1949) gives a single record from St. Audries, S, which is in v.c. 5 near Watchet, outside the area covered by this Report.

TRUE BUGS (Hemiptera) by R.S. Cropper

Heteroptera

Although the general impression was that numbers in 1982 were not exceptional, a few interesting records were made. With so few people studying this group it is not difficult to turn up new records with a little effort, and this applies even to species said to be nationally common. The Flybug, *Reduvius personatus*, one of the selected species, has still to turn up in the district and I would appreciate any information on this species.

Elasmucha grisea L. Leigh Woods (FC), 12 June (RWR).

Nabis ferus L. From hazel hedge, Winford, 19 September.

Stalia major Costa Under driftwood, saltmarsh, Berrow, S, 30 August.

Orius laevigatus Fieber. Many on plants on western end of Steep Holm, 31 July. This small species is very local and irregular in appearance, but has been recorded previously on Steep Holm and from five mainland sites in v.c. 6. (See this report for 1978).

Psallus betuleti Fallén. On alder, R. Avon, Saltford, 24 June.

P. lepidus Fieber. Several on ash, Ebbor Gorge, nr Wells, S, 13 June.

Plagiognathus albipennis Fallén. On curled dock (*Rumex crispus*), Berrow, S, 11 July.

Heterocordylus genistae Scop. Several on dyer's greenweed (*Genista tinctoria*), Hursley Hill, nr Pensford, 24 June. Usually found where this host plant occurs.

Calocoris alpestris (Meyer-Dur.) On flower of hogweed (*Heracleum sphondylium*), wood border, Saltford, 24 June. This mainly northern species has been recorded from Tockington, nr Bristol and the Mendips but this is the first report since 1957. Its habitat is the margins of damp woods and it occurs on nettles - a thorough search of likely areas may well be productive.

C. fulvomaculatus Degeer A few in mixed hedgerow, Winscombe, 20 June.

Adelphocoris seticornis Fab. Two in damp meadow, Shapwick Heath, S, 4 July. This rare species has been reported only occasionally and not previously in Somerset. Its habitat is grass and rushes interspersed with meadow pea (*Lathyrus pratensis*), greater birdsfoot trefoil (*Lotus uliginosus*), and tufted vetch (*Vicia cracca*) which are its host plants.

Ranatra linearis L. Round pond, Clarken Coombe, Ashton Park, nr Bristol, 22 April and Priddy Pools, Mendip, S, 11 August. This unmistakable water bug is infrequently recorded and must, no doubt, be overlooked.

Corixa dentipes Thompson A second specimen from Orchardleigh Lake, nr Frome, S, 25 March. It is likely that this locality is a breeding site for this species which is very similar to the common *C. punctata*. See 1980 Report.

Arctocorisa germari Fieber Two, Orchardleigh Lake, nr Frome, S, 25 March.

Homoptera

Iassus lanio L. On oak, Westhay Moor, nr Westhay, S, 12 September.

SAWFLIES, BEES, WASPS, ANTS etc. (Hymenoptera) by R.M. Payne

Symphyta (Sawflies)

Monostega abdominalis Fab. Bred from larvae found on yellow loosestrife (*Lysimachia vulgaris*), Berrow, S, (HKB). This is a small species which occurs on several plants of the family *Primulaceae* and is considered to be widespread in the southern parts of Britain.

Aculeata (Bees, Wasps and Ants)

Of the species selected for special study there was again no records of the Hornet (*Vespa crabo*) in the district or any further localities for the Wood Ant (*Formica rufa*) reported. Among the ants, I found *Lasius alienus* Forster under stones on Crook Peak, Compton Bishop, S, while the bees *Megachile ligniseca* Kirby and *Osmia leaiana* Kirby were two of the less common species feeding at flowers of a hawkweed (*Hieracium speluncarum*) in my garden at East Harptree in July.

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BRISTOL BOTANY IN 1982

by A.J. Willis

(Department of Botany, University of Sheffield)

The year 1982 was notable for some extreme weather conditions, and also for some interesting additions to the flora of Bristol. The exceptionally low temperatures and snow of January, after the very cold weather of December 1981, were reminiscent of the severe conditions of the winter of 1962-63. The lowest temperature recorded at Long Ashton Research Station was -14.4^{o}C, but records for other parts of the Bristol area indicate temperatures even lower than this on several consecutive nights following heavy snowfall in early January. Much aerial damage to garden trees and shrubs resulted. The most frequent reports of complete destruction were of species of *Hebe*; also killed were *Cupressus macrocarpa* (though *Chamaecyparis lawsoniana* growing with it was unaffected), some cultivars of *Hedera helix*, especially on N.E. facing walls, and *Laurus nobilis* in some places though recovering in others (A.L.G., P.J.M.N.). The aerial parts of *Buddleja davidii* and *Lonicera nitida* were severely affected, but these showed signs of recovery by the summer; so to did species of *Eucalyptus* although their leaves were badly browned (A.L.G, P.J.M.N.). Leaf-fall in *Ligustrum ovalifolium* and *Euonymus japonicus* was unusual in being complete, but damage to only the latter was noticeable. Of natives, the only species to be severely affected was *Ulex europaeus*; single bushes in exposed positions were killed and larger colonies suffered to varying extents (A.L.G.). The fine *Clerodendron* tree in Pembroke Road, Clifton, Bristol, survived and flowered satisfactorily (P.J.M.N.).

February and March, however, were milder than usual, and the spring flowers were open at about the normal time. *Helleborus viridis* was flowering well at Nettlebridge in early February, and flowers of *H. foetidus* on Churchill Batch were just open on the last day of January. The first primroses were in flower near Sidcot in the last week of February (R.S.C.). A period of hot, dry weather in late May and early June leading to almost drought conditions gave the countryside a 'late August look' by that time. Annual crucifers, which would normally be still in flower then, were skeletons only, *Crepis vesicaria* was noted as in the final stages of seed dispersal, and *Stachys palustris* in flower at Willsbridge (A.L.G.). Some late summer flowering species, including *Artemisia vulgaris* and *Eupatorium cannabinum*, were well in flower by mid-June, but freak hailstorms, torrential rain and high winds a little later in the month damaged the vegetation considerably - in Speedwell, Bristol, there were 4 ft. drifts of hailstones (A.L.G.). The more normal weather of later summer resulted in abundant second crops of some annuals. However, despite the apparently favourable conditions for the growth of adventives, for the first time in a number of years very little of note was seen at the usual sites for adventives at Avonmouth (A.L.G.). The year ended with an average October, a less cold but wetter November than usual and a somewhat chilly and wet December. As a whole, the year was warmer and wetter than normal, June being the wettest month and May the driest. Altogether, a total of 975.2 mm of rainfall was recorded at Long Ashton Research Station, a value of 111% of the average annual figure; hours of sunshine for the year were just above average (102%).

Although the flora of the Bristol area is probably one of the best known and fully documented in Britain, records continue to be made of species new to the area and of new localities for previously reported species. A most interesting and excellent addition to the flora of North Somerset is the Violet Helleborine, *Epipactis purpurata*, an orchid of woodland developed on calcareous soils. Also first extensively reported from North Somerset, notably from the Somerset Levels and associated areas, is the naturalised *Elodea nuttallii*, an aquatic which is spreading rather rapidly in Britain. The report of the hybrid *Senecio* x *londinensis* from Avonmouth is also believed to be the first for the Bristol district. A very striking discovery from Avonmouth is of the attractive *Linaria supina*, a very large population developing and seeding freely. Yet a further new form for the area is the newly described *Pulmonaria* 'Mawson's Blue', established in a plantation at Horton. While some of these plants reported for the first time have doubtless reached the area fairly recently, others may be of longer standing, remaining undetected in their vegetative form until flowers happen to be noticed. The high persistence of some species is illustrated particularly well in this year's entries by, for example, the reports of *Polygala calcarea* in the North Somerset site where it was found in the 1920's, of *Hermodactylus tuberosus* surviving at Sand Point where it was feared lost, and of *Pachyphragma macrophyllum* at Belmont Wood, Failand. Also persistent is *Aster linosyris* at Uphill (but decreasing) and Brean Down (R.S.C.). Among interesting adventives recorded this year is the umbellifer *Trachyspermum ammi*, represented by very tiny plants; also seedlings have been found of the very rare cudweed *Gnaphalium undulatum* for which there are very few British records.

Increasing attention to critical groups is improving our as yet incomplete knowledge of the occurrence and distribution of such taxa. This year there are important entries relating to *Rubus*, *Hieracium* and *Taraxacum*.

The Rockrose *Helianthemum canum* has again been wrongly attributed to the Bristol area. In her book *The Natural History of Britain and Ireland* (Michael Joseph Ltd., 1981, p. 108), Dr Heather Angel refers to this plant in the Avon Gorge. While *Helianthemum chamaecistus* is a common plant in the Avon Gorge, *H. canum* is not known in the Bristol area.

Another correction is needed with respect to the location of records made in recent years, given as St Philips Marsh, by A.L. Grenfell, who informs me of his confusion with the location known as St Philips. All previous records (by A.L.G.) reported for St Philips Marsh refer to St Philips (notably entries in *Bristol Botany in 1980* relating to *Lathyrus aphaca*, *Linaria x dominii* and *Potentilla recta*). St Philips refers to the area of railway property which formerly comprised the motive power depot at Barrow Road, the adjoining sidings, coaling plant, marshalling yards, St Philips station and the surrounding residential and industrial area; St Philips Marsh lies to the south east of Temple Meads Station.

A long-standing member of the Society, Miss Mabel Bowen, who joined in 1924, died after a short illness in July 1982. Formerly the Vice-Principal of Redland Training College, she was until recent years well-known at meetings of the Society. Miss Bowen was a friend of the Sandwiths who did so much for Bristol Botany.

Names of contributors associated with several records, or with the determination of plants, are abbreviated thus:

J.A.	Mrs J. Appleyard	C.K.	Mrs C. Kitchen
E.J.C.	E.J. Clement	M.A.R.K.	M.A.R. Kitchen

BRISTOL BOTANY IN 1982

R.S.C.	R.S. Cropper	J.O.M.	J.O. Mountford
T.G.E.	T.G. Evans	P.J.M.N.	P.J.M. Nethercott
R.F.	Lady R. FitzGerald	A.N.	A. Newton
I.F.G.	Miss I.F. Gravestock	R.M.P.	R.M. Payne
D.E.G.	D.E. Green	R.D.R.	R.D. Randall
A.L.G.	A.L. Grenfell	R.G.B.R.	Capt. R.G.B. Roe, R.N.
C.W.H.	C.W. Hurfurt		

G: Gloucestershire
S: Somerset

For details of the area covered by this report, see *Bristol Botany in 1978*, p. 35.

Blechnum spicant (L.) Roth   Several fine plants, shady bank, Westhay Moor, S, R.S.C.

Ranunculus bulbosus L.   A form with petals white above and lemon-yellow beneath, giving a pale lemon-yellow appearance, roadside, Hambrook, G, A.L.G. Comparable plants have been reported (P.J.M.N.) from Durdham Down (see *Bristol Botany in 1981*).

R. arvensis L.   Large colony, freshly ploughed grassland, Hinton Charterhouse, S, D.E.G.

Aquilegia vulgaris L.   Several flowering plants by woodland path, Banwell Hill, S, R.S.C. Dark-flowered form, Windsor Hill Quarry, Shepton Mallet, S, I.F.G. and Mrs M.A. Silcocks. Also with *Lychnis coronaria* (L.) Desr. on rough grass bank, near Rose Wood, north of Axbridge, S, J.O.M.

Nymphaea alba L.   Pool, East Harptree, S, R.S.C.

Ceratophyllum submersum L.   In limited quantity, Kingston Seymour, S, P.J.M.N.

Rorippa microphylla (Boenn.) Hyland.   Ditch, Stoke Moor, near Wedmore, S; also in ditch at Uphill, S, J.O.M.

Polygala calcarea F.W. Schultz   A large colony in rough pasture, at about 350 feet, above Combe Hay in South Stoke parish, S, D.E.G. The site is just over half a mile from the original station near Fortnight (see White, *Flora of Bristol*, p. 180), and appears to agree closely with the locality where H.S. Thompson found the plant (see *Bristol Botany in 1920 and 1921*). The persistence of the plant in this site over so long a period as well as in the original station is of considerable interest. Searches (by R.G.B.R.) of hill slopes S.E. of Combe Hay, where the plant was reported by D.E. Coombe in 1944, have, however, been unsuccessful. The plant also does not seem to have survived on Odd Down, but the 'tumpy field' there has been substantially changed by tipping.

Hypericum humifusum L.   A single flowering plant, lawn, Burnham-on-Sea, S, R.S.C.

Silene noctiflora L.   With *S. alba* (Mill.) E.H.L. Krause x *S. dioica* (L.) Clairv., disturbed hedge, Wotton-under-Edge, G, C.K. and M.A.R.K.

Stellaria palustris Retz.   Edge of ride, Tadham Moor, and ditch, Westhay Moor, S, J.O.M.

Sagina nodosa (L.) Fenzl Edge of ride, Forestry Commission plantation, East Harptree, S, R.M.P. This Pearlwort appears to be decreasing in North Somerset.

Malva neglecta Wallr. On waste ground, Bannerdown, near Bath, S, D.E.G. and T. Cairns.

Astragalus glycyphyllos L. Disused railway cutting, Midford, S, C.K. and M.A.R.K.

Vicia sylvatica L. Steep roadside bank, Hinton Blewitt, S, R.M.P.

Lathyrus montanus Bernh. Hinton Charterhouse, S, D.E.G. Not common around Bath.

Rubus sublustris Lees Lyncombe Vale, near Bath, and elsewhere, S, R.D.R. Frequent on the Oolite.

R. rubritinctus W.C.R. Wats. Wick Rocks, G; Hampton Down and Widcombe Hill, near Bath, S, R.D.R., det. A.N. More frequent on rocks older than the Oolite.

R. cardiophyllus Muell. & Lefèv. Wick Rocks, Rocks, G, R.D.R., det. A.N.

R. echinatus Lindl. Wick Rocks, G. Also at Horsecombe and Lyncombe Vale, near Bath, S, R.D.R., det. A.N. This distinctive bramble is frequent on soils which are approximately neutral, especially between Compton Dando and Chew Valley Lake.

R. rufescens Muell. & Lefèv. Wick Rocks, G, R.D.R.

R. troiensis A. Newton Wick Rocks, G, R.D.R., det. A.N. A striking bramble, low-growing with large starry flowers. Previously known from Hanham Gorge, G, R.D.R., and recorded by J.W. White (*The Flora of Bristol*, 1912, p. 281) from Durdham Down under the name *R. Drejeri*.

R. villicauliformis A. Newton Abundant, with *R. polyanthemus* Lindeb., on Blackdown, Mendip, S, R.D.R., det. A.N. *R. villicauliformis* is frequent on high ground in Devon and Cornwall (see *Watsonia*, Volume 14, 76-77, 1982, Two South-western brambles). The present record is the first certainly confirmed one for this bramble, outside Devon and Cornwall.

Crataegus oxyacanthoides Thuill. (*C. laevigata* (Poiret) DC.) Near Golf Course, Stinchcombe Hill, Dursley, G, C.K. and M.A.R.K.

Daphne laureola L. Abundant as a roadside hedge plant, Wickwar, G, C.K. and M.A.R.K. Nearby was *Equisetum telmateia* Ehrh.

Torilis nodosa (L.) Gaertn. In short turf over rock outcrop, near Battlefields, Lansdown, Bath, S, per D.E.G.

Sison amomum L. Roadside verge, Claverton, Bath, S, R.D.R.

Carum carvi L. A fine flowering patch of at least 100 plants, roadside, outskirts of Avonmouth, G, R.F., conf. A.L.G.

Sium latifolium L. In ditches near Vole, also north of Mark and on Edington Moor, S, J.O.M.

Oenanthe pimpinelloides L. Damp pasture, Norton St. Philip, S, R.D.R. This Dropwort is not common around Bath. Also in lightly grazed pasture, Rockley, near Compton Bishop, S, J.O.M.

Polygonum mite Schrank Ditches, Tealham Moor and Tadham Moor; also Cheddar Moor, S, J.O.M.

Rumex x acutus L. Bank of ditch, Stoke Moor and banks of the River Axe, Clewer, S, J.O.M.

R. maritimus L. With *R. palustris* Sm., in fine condition on banks of newly constructed lagoons on Shapwick Heath and also in abandoned peat cutting on Westhay Heath, S, R.S.C. Also on bare peat bank, Queen's Sedge Moor, S, J.O.M.

Lysimachia vulgaris L. Dunes, Berrow, S, R.S.C. Also ditch near Banwell, S, and at Binham Moor, north of Mark, S, J.O.M.

Samolus valerandi L. Plentiful in hillside marsh between Wellow and Norton St. Philip, S, D.E.G.

Menyanthes trifoliata L. With *Galium uliginosum* L., marshy isolated pond on Mendip above West Harptree, S, R.M.P.

Verbascum nigrum L. With *Lactuca serriola* L., on demolished site, Longwell Green, near Willsbridge, S, C.W.H.

V. virgatum Stokes On old Fullers Earth works, Odd Down, near Bath, S, D.E.G. Also *V. blattaria* L. (conf. E.J.C.) and *Heracleum mantegazzianum* Somm. & Levier.

Calamintha nepeta (L.) Savi Adjoining house, West Mall, Bristol, G, I.F.G.

Lamium amplexicaule L. Two flowering plants, garden path, Berrow, S, R.S.C.

Galium x pomeranicum Retz. With the parents, *G. mollugo* L. and *G. verum* L., in rocky limestone grassland, Brean Down, S, J.O.M.

Valerianella carinata Lois. Combe Hay, S, D.E.G. Frequent around Bath.

Senecio x *londinensis* Lousley (*S. squalidus* L. x *S. viscosus* L.) On railway ballast, near St. Andrew's Road Station, Avonmouth, G, Dr A.C. Leslie. The present record may be the first in the Bristol area for this hybrid. On a railway bank nearby was a large colony of *Petroselinum segetum* (L.) Koch.

S. sylvaticus L. Nett Wood, East Harptree, S, R.M.P.

Cirsium x forsteri (Sm.) Loud. With both parents (*C. palustre* (L.) Scop. and *C. dissectum* (L.) Hill), marshy pond, Blackdown, Mendip, S, D.E.G., conf. C. Jeffrey, who noted that whereas specimens of the hybrid showing marked features of *C. palustre* may be more common, the expression of *palustre*-morphology in the hybrids is never dominant to the extent that the *dissectum*-morphology can be. In the herbarium at Kew *dissectum*-like hybrids are represented from N. Hants, Surrey, Kent and Fermanagh, but the Mendip specimen is the most extreme *dissectum*-dominant specimen seen by C. Jeffrey. Also two plants, with both parents, in damp *Molinia* grassland, Ashcott Heath, S, J.O.M.

Lactuca virosa L. About twenty plants adjoining a wall, roadside between Brislington and Keynsham, S, A.L.G. This report constitutes a further extension of the range of this species which is rare in Somerset.

Hieracium acuminatum Jord. Wick Rocks, G; also by railtrack at Limpley Stoke, Keynsham and Shockerwick and at edge of wood, Blackdown, S, D.E.G., R.D.R. and A.L.G.

H. umbellatum L. Railtrack, Keynsham, and edge of woodland, Woollard, S, D.E.G. and R.D.R.

Taraxacum cordatum Palmgren With *T. oxoniense* Dahlst., river side of towpath below Leigh Woods, Bristol, S, T.G.E., det. C.C. Haworth and Dr A.J. Richards. Also along the towpath were *T. undulatiflorum* M.P. Christiansen and *T. ekmanii* Dahlst., T.G.E., det. C.C. Haworth. All of these Dandelions, collected in April, are in Herb. T.G.E.

Alisma lanceolatum With. In rhyne, Ford Common, north of Berrow, S; also ditch, Cote Corner, near East Huntspill, S, J.O.M.

Stratiotes aloides L. About half a dozen plants in pool in the dune system at Berrow, S, R.S.C. This is certainly a recent introduction.

Potamogeton pusillus L. Three sites in the Somerset Levels including Knowle Moor and Mark Moor, S, J.O.M.

P. berchtoldii Fieb. About 35% cover in brackish tributary of the tidal Axe, Brean Cross, S; with *Butomus umbellatus* L. in ditch, Puxton, S; also with *Oenanthe fistulosa* L. and *Rumex palustris* Sm. in ditches, Tealham Moor, S, J.O.M.

Polygonatum multiflorum (L.) All. Several plants adjoining Emborough Pond, S, R.S.C. Also *Hydrocotyle vulgaris* L.

Leucojum vernum L. Two clumps, flowering at The Monument, Lansdown, near Bath, S, C.K. and M.A.R.K.

Galanthus nivalis L. For a number of years, some six clumps established in field which is grazed and mown, adjoining Willsbridge-Keynsham road, S, C.W.H.

Cephalanthera damasonium (Mill.) Druce Foxhill, Bath, S, D.E.G.

Epipactis purpurata Sm. A colony, first found in 1981, in wooded area within the Chew Valley river system, S, R.D.R. This important record is the first for this orchid for North Somerset, v.c.6. A small colony of *E. helleborine* (L.) Crantz grows nearby; the occurrence of hybrids is therefore a possibility.

Coeloglossum viride (L.) Hartm. Roadside bank between Priddy and Cheddar Gorge, S, R.F.

Scirpus fluitans L. In cleared peat ditch, Walton Moor, S, J.O.M. Associates included *Myriophyllum alterniflorum* DC., *Baldellia ranunculoides* (L.) Parl. and *Potamogeton coloratus* Hornem.

Carex pilulifera L. In dry peaty pasture, Godney Moor, S, J.O.M.

C. x pseudoaxillaris K. Richt. Banks of ditch, with *Ranunculus trichophyllus* Chaix, moorland south of Cheddar, S, J.O.M.

C. divulsa Stokes ssp. *leersii* (Kneucker) W. Koch Hassage Hill, Wellow, S, R.W. David.

Glyceria plicata Fr. Kingston Seymour, S, P.J.M.N.

Catabrosa aquatica (L.) Beauv. Rare, in ditch, Catcott Burtle, S, J.O.M.

Elymus pycnanthus (Godron) Melderis An aristate form of Sea Couch-grass (formerly known as *Agropyron pungens*), bank of Avon, Sea Mills, G, I.F.G.

Alopecurus bulbosus Gouan With *Trifolium fragiferum* L., *Artemisia maritima* L. and *Bupleurum tenuissimum* L., Whale Wharf, Littleton-on-Severn, G, C.K. and M.A.R.K.

ALIENS. *Azolla filiculoides* Lam. Less abundant than usual and in only a few rhynes at Kingston Seymour, S, P.J.M.N. Also with *Ceratophyllum demersum* L. and *Zannichellia palustris* L. in roadside ditch, north of Kewstoke, S, J.O.M.

Papaver atlanticum (Ball) Coss. Several plants, with other *Papaver* species, on sandy bank, Sand Bay, S, A.L.G. Previous records of *P. lateritium* C. Koch probably refer to this taxon.

Erysimum cheiranthoides L. Several plants, and also *Chenopodium polyspermum* L., on margins of Cheddar Reservoir, S, R.S.C. On imported soil, Green Park, Bath, S, D.E.G.

Camelina sativa (L.) Crantz Bird-seed alien, with *Digitaria sanguinalis* (L.) Scop., *Sorghum halepense* (L.) Pers. and *Panicum miliaceum* L. (all grasses det. P.J.O. Trist), Sand Lane, Wedmore, S, J.O.M.

Pachyphragma macrophyllum (Hoffman) Busch Persistent in Belmont Wood, Failand, S, A.L.G., also C.K. and M.A.R.K. First recorded in this site in 1964 (see *Bristol Botany in 1964*).

Beta trigyna Waldst. & Kit. Car park area, Marlborough Hill, Kingsdown, Bristol, G, R.F., det. A.L.G. Also *Ammi majus* L.

Hibiscus trionum L. A single plant, and also a single specimen of *Rhus typhina* L., Brislington Tip, S, A.L.G. Also much *Papaver rhoeas* L., the multicoloured double-flowered Simpson's strain, first established on tipped top-soil in 1981. The tip is now being converted into a local amenity.

Geranium versicolor L. Naturalised, together with *Teucrium chamaedrys* L., *Salvia horminoides* Pourr. and *Erigeron mucronatus* DC., Sand Point, S, T.G.E.

Colutea arborescens L. A single plant on roadside verge, Hambrook, G, A.L.G.

Lathyrus grandiflorus Sibth. & Sm. Lane, Stoke Bishop, Bristol, G, I.F.G.

Rubus phoenicolasius Maxim. Several fruiting plants, edge of woodland some distance from habitation, Wotton-under-Edge, G, C.K. and M.A.R.K., det. A.L.G.

Potentilla recta L. A spreading colony, on railway fill, near St. Andrew's

Road Station, Avonmouth, G, A.L.G. and R.F. Also rail track, Radstock, S, D.E.G.

Prunus domestica L. ssp. *insititia* (L.) C.K. Schneid. Fruiting near Millpill Bridge, on bank of the Trym, G, I.F.G.

Hedera hibernica hort. Clifton, Bristol, G, I.F.G., conf. A. Rutherford.

Bupleurum subovatum Link ex Sprengel With *Centaurea diluta* Aiton on canal dredgings, Widcombe, S, R.D.R.

Trachyspermum ammi (L.) Sprague ex Turrill Tiny plants, some less than an inch high in fruit, pavement, near Berkeley Square, Bristol, G, R.F., conf. A.L.G. This plant is the source of the ancient spice ajowan.

Euphorbia characias L. ssp. *wulfenii* (Hoppe ex Koch) A.R. Sm. Still thriving and seeding well near Sand Point, S, A.L.G. Listed in *The Flora of Somerset* (R.G.B. Roe, 1981) as an extinct casual, last recorded in 1953 (see *Bristol Botany in 1953*).

Polygonum sachalinense F. Schmidt In hedgerow, roadside, near Weston-in-Gordano, S, T.G.E.

P. polystachyum Wall. ex Meisn. Rough ground with *Chenopodium ficifolium* Sm. adjoining drove, Knowle Moor, Somerset Levels, S, J.O.M.

Buddleja davidii Franch. var. *nanhoensis* (Chittenden) Rehder St. Philips, Bristol, G, Dr A.C. Leslie. Other plants of interest from this site include *Hieracium vagum* Jord., *Cotoneaster salicifolius* Franch., *Pyracantha coccinea* M.J. Roem., *Sorghum halepense* (L.) Pers., *Echinochloa colonum* (L.) Link and *E. crus-galli* (L.) Beauv. (A.L.G.).

Trachystemon orientalis (L.) G. Don Well established in plantation, Lasborough, G, C.K. and M.A.R.K.

Pulmonaria 'Mawson's Blue' In plantation, Horton, G, C.K. and M.A.R.K., det. A.L.G. This new alien is described in *B.S.B.I. News*, No. 25, pp. 16-17 (1980), and is known from Surrey, South Essex and Midlothian.

Solanum nitidibaccatum Bitter Elberton Tip, G, A.L.G. and T.G.E.

Linaria supina (L.) Chazelles On railway ballast near St. Andrew's Road Station, Avonmouth, G, A.L.G. An area of some 4000 square yards was dominated by this very rare plant. In mid May it was in flower and fruit, a population estimate indicating at least a quarter of a million specimens of this freely-seeding annual (a very few appeared to be longer lived). Further monitoring of the population suggested that approaching half a million plants were present during the summer, flowering continuing well into December. This is a notable addition to the flora of the Bristol region.

Melissa officinalis L. Near a farm-house, Kingston Seymour, S, P.J.M.N.

Petasites fragrans (Vill.) C. Presl Base of wall, Willsbridge, S, C.W.H.

Gnaphalium undulatum L. A few seedlings at Bitton, G, A.L.G. Thought to have been brought in by a commercial vehicle operated by a Channel Island freight carrier. The Cape Cudweed has long been known in Guernsey, but there are only five other records (one in 1982) for mainland Britain. New to the Bristol area.

Erigeron philadelphicus L. In 1979, an atypical form, old tip, Lawrence Weston, G, I.F.G. (det. E.J.C.). Also elsewhere on the tip in 1980, C.M. Lovatt.

Echinops bannaticus Rochel ex Schrader One plant established on rough ground, roadside, Clapton-in-Gordano, S, T.G.E. Nearby *Mentha spicata* L. was established in hedgerow.

Hieracium speluncarum Arv.-Touv. Several fine plants at Clifton, Bristol, G, about a quarter of a mile from the main Richmond Hill site, P.J.M.N.

Elodea nuttallii (Planch.) St. John Recorded in variable amounts up to some 65% cover in ditches and rhynes in fourteen stations in North Somerset, S, J.O.M. This introduced plant is known to spread rapidly. The North Somerset sites include Clevedon, Nailsea, Kenn Moor, New Ear (New Cut, near the River Yeo), the River Axe, Tarnock, Walrow and Godney. Associates may include *Ceratophyllum demersum* L., *Myriophyllum spicatum* L., *Zannichellia palustris* L., *Wolffia arrhiza* (L.) Hork. ex Wimm. and *Azolla filiculoides* Lam.

Allium carinatum L. A pale pink form, Roman Way, Stoke Bishop, Bristol, G, I.F.G.

Hermodactylus tuberosus (L.) Mill. Persistent in several closely associated sites (flowering in April), Sand Point, S, C.K. and M.A.R.K. R.G.B. Roe's *The Flora of Somerset* lists this plant under extinct casuals. It was first reported in 1950 from Sand Point (see *Bristol Botany in 1950*). Also in long length of hedge by roadside in this site is *Ruscus aculeatus* L., but completely hidden by vegetation late in the season, C.K. and M.A.R.K.

Eragrostis neomexicana Vasey Railway line, Cumberland Basin, Bristol, G, A.L.G. A remarkable crop of adventives, mostly of N. American origin, was produced here, including *Setaria verticillata* (L.) Beauv., *Echinochloa colonum* (L.) Link., *Panicum capillare* L., *Amaranthus albus* L. and *A. retroflexus* L. (A.L.G. *et al*.).

BRYOPHYTES. *Marchantia alpestris* (Nees) Burgeff In flower pots, Browne's Nurseries, Wells, S, J.A. Previously regarded as a variety of *Marchantia polymorpha*, this taxon is now elevated to specific rank. Formerly considered a liverwort of alpine areas, this hepatic is now known to be widely distributed in plant nurseries.

Lophozia bicrenata (Schmid. ex Hoffm.) Dum. Waste ground, Stratton-on-the-Fosse, S, J.A.

Lejeunea lamacerina (Steph.) Schiffn. Bourton Combe, S, J.A.

Pleurochaete squarrosa (Brid.) Lindb. On limestone outcrop, near Redhill, S, J.A.

Isothecium striatulum (Spruce) Kindb. Bourton Combe, S, J.A.

I thank everyone who has supplied records and helped with these, notably Mr A.L. Grenfell, Mr P.J.M. Nethercott and Capt. R.G.B. Roe, R.N. I am indebted to Long Ashton Research Station for the supply of meteorological records.

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5) The style and conventions of the Proceedings must be followed in relation to headings and the citation of references.

6) References should be listed in alphabetical order at the end of the manuscript, taking the following form:

   Strong, L. (1981). Extensive damage to mummy H7386 by dermistid beetles. *Proceedings of the Bristol Naturalists' Society*, 40, (1980), 27-29.

   Mitchell, A.H.G. & Garson, M.S. (1981). *Mineral Deposits and Global Tectonic Settings*. London, Academic Press.

7) Line-drawings should be in black ink on white paper or card and all scales and labels should be inserted by the author(s). Drawings, tables, etc. should not exceed 160 mm (6¼") in width and 235 mm (9¼") in depth. Photographs and drawings will be returned on request.

8) Brief captions to the illustrations should be gathered together to form an addendum to the manuscript.

9) A shortened version of the title suitable for page-headings should be supplied.

10) One set of proofs will be supplied; corrections must be kept to a minimum.

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1983

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OF THE

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ASSISTED BY A COMMITTEE

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GENERAL & SECTIONAL PROCEEDINGS

REPORT OF COUNCIL, 1983

Membership at the end of the year stood at 605 including 3 juniors and 5 affiliated societies.

At the A.G.M. the Officers and Members of Council were elected with Mr V. Dennison as President.

The Annual Supper was held in April when Dr D.V. Richmond spoke on the Cheddar Valley Railway Walk.

Council has supported the foundation of a separate body equally sponsored and controlled by the BNS and the Bristol Ornithological Club, which shall be responsible for producing an annual Bird Report for Avon County starting with 1983. The BNS shall buy enough copies of the Bird Report from the new body to supply one to each member and sufficient extra copies for exchange with other publications; the Report will remain in effect part of the *Proceedings* but under separate cover and independent editorship.

The Society's library was closed during the year because of rebuilding work at the City Museum. Council wished to thank the team of members, led by Mrs A. Hollowell, who helped to move the contents of the library into temporary storage. Council also wished to thank Mrs G.B. Castle for her work in publicising the activities of the Society.

Over half of the Bulletins are hand delivered - the Society wishes to thank the many members who undertake this task.

We record with regret the deaths of the following members: Colonel G.A. Bridge, Mrs B.M. Dalby, Dr A.F. Devonshire, Miss M.D. Hiley, Mr H.G. Hockey and Dr G.K. Taylor.

ACCOUNT OF GENERAL MEETINGS, 1983

January: Presidential Address - "British Colombia and the Canadian Rockies", by J.G. Prince.

February: "The Natural History of Gwent", by C. Titcombe.

March: "Travels in Tibet", by V. Dennison.

October: "A Biologist in New Zealand", by Dr C. Little.

November: "Bird, Amphibian or Insect?", by J. Burton.

December: Members' Evening - Slide Show:

"Close-ups of Fruits and Flowers", A.P. Richards.
"A Few British Isles", Miss R.C. Lee.
"Travels in the Alps", D.A.C. Cullen.
"Flowers of Iceland", V. Dennison.

GENERAL FIELD MEETINGS, 1983

A full account of the following meetings is kept in the records of the Field Committee:

19 Mar Mrs V.J. Kenney. Coastal walk up the Severn nr Aust. For the few attending, this was a springtime walk in good weather. Larks singing, celandine and coltsfoot in flower and primroses on the banks.

GENERAL & SECTIONAL PROCEEDINGS

1 Apr	Miss R.C. Lee. Visit to Wolvesnewton Folk Museum and Craft Centre, Gwent, with a circular walk from Usk in the afternoon, when early spring flowers were seen and bird song from early migrants heard.
27 Apr	Miss R.C. Lee. Afternoon walk around Ashton Court, taking in part of the Nature Trail. A very heavy thunderstorm half way through put an end to the walk and the party paddled home along paths which had become streams.
30 Apr	Mrs V.J. Kenney. A walk up Tyley Bottom from Wotton-under-Edge. Good weather in the middle of a poor spring. Early flowers and migrant birds, and a great deal of mud!
18 May	Mr D.A.C. Cullen. An evening walk in the Castle Combe area; along the Byebrook Valley from Ford. Good birdsong and spring flora. A pleasant dry evening.
21 May	Miss M.E. Jervis (joint meeting with the Ornithological Section). Through woodland up Horner Valley, Exmoor, and onto Horner Hill. Spring migrants were heard and seen. Good views of a buzzard, and herd of red deer. Typical flora of acid soil.
2 Jun	Miss J. Cox. Afternoon walk from Saltford to Bath. Sadly, only two members attended. Short walk along disused railway track. Good flora.
22 Jun	Mrs A.J. Hollowell. Evening walk from Cambridge Batch through boggy area and woodland. Waterside plants, hedgerow shrubs, woodland trees and ferns. Fine view of damsel fly *Agrion virgo*.
25 Jun	Miss R.C. Lee. All day meeting by bus to Goblin Combe and Wrington Warren. Six members attended. A good number of flowers, including orchids, were found and some lichens noted. Little bird song.
16 Jul	Mr R. Curber. Afternoon walk from Saltford to Keynsham along the R. Avon and back by disused railway line. Only two members attended. Some bird life but not a great deal. Plants and butterflies.
13 Aug	Mrs V.J. Kenney & Miss R.C. Lee. Walk in Forest of Dean following the New Fancy Trail, where a great variety of trees were seen. A number of flowers were found, but very few birds heard.
10 Sep	Mr A.C. Titchen (joint meeting with Botanical Section). To the Royal Horticultural Society's garden at Wisley. A very successful meeting much enjoyed by the 35 members who attended.
14 Sep	Miss M.E. Jervis. Afternoon walk in Blaise Woods, up the Henbury Trym, up to the Castle and back to Combe Dingle. Some ferns and flowers were noted, a small amount of bird song, and a brief glimpse of a Kingfisher on the Trym.
29 Oct	Miss R.C. Lee. Painswick area: a walk up the valley of the Painswick stream, past two mills and, in the afternoon, on to Painswick Beacon. Excellent weather, autumn colours good and very fine views from the Beacon
27 Nov	Mrs V.J. Kenney. Severn Estuary: a walk up and down the west side of the estuary from near Portskewett. Flocks of waders in the distance, some Redwing. Interesting water plants in the ditches.

STATEMENT OF ACCOUNTS FOF

1982			
	Members' Subscriptions:		
2491	Full members	2394.50	
268	Full members of the same household	263.75	
50	Corresponding members	45.50	
24	Associates	4.00	
6	Junior	6.00	
42	Affiliated societies	29.25	2743.00
2881			
32	Donations		12.00
35	Proceedings: Grant	35.00	
92	: Sales	61.18	96.18
-	Field Committee, profit on meetings plus grant	122.89	122.89
43	Sales of journals, books and membership lists		51.78
	Buffet supper: profit (£34.03), outstanding account (£38.00)		72.03
125	Interest on deposit account		116.88
3	Interest from National Savings Bank		2.90
17	Interest and premium on Bonds		16.50
16	Members' contributions to the Harry Savory Illustrations Fund		-
16	Members' contributions to the Conservation Appeal		71.00
100	South Brecon Field Study Centre donation		-
-	Members' contributions to the Dr A.F. Devonshire Memorial Fund		161.60
49	Return of Mammal Section balance		-
1119	Balance from last account		1297.13
£4528			£4763.89

P.J.M. NETHERCOTT
Hon. Treasurer
2 May 1984

Audited and found correct
T.B. SILCOCKS
Hon. Auditor
28 June 1984

ENDED 31 DECEMBER 1983

1982			
742	General printing and stationery	564.92	
516	Postages and telephone	361.43	926.35
1057	Proceedings		-
59	Books	110.81	
134	Subscriptions for journals etc.	147.00	
15	Fire Insurance (library)	15.00	272.81
12	Contributions to SWNU etc.		7.75
75	Contributions to conservation projects		-
-	The Woodland Trust - Dr A.F. Devonshire Memorial Appeal		161.60
277	Expenses of general indoor meetings including hire of rooms		218.00
50	Field Committee, loss on meetings		-
19	Buffet Supper, loss		-
275	Grants to Sections:		
	Botanical	80.00	
	Ornithological	130.00	
	Geological	80.00	
	Entomological	35.00	
	Field Committee	30.00	355.00
	Balances to next account:		
368	Cash in bank, current account	148.44	
573	Cash in bank, deposit account	2390.00	
58	Deposit in National Savings Bank	61.05	
200	£200 8½% British Savings Bonds (repaid in year)	-	
80	In hands of Field Committee	203.09	
18	In hands of Treasurer	19.80	2822.38
£4528			£4763.89

NOTES: (1) Earmarked for the Harry Savory Illustrations Fund £232.49

(2) Earmarked for the Conservation Appeal £192.85

(3) These accounts do not record balances held by sectional treasurers and the Ornithological Special Fund of £168.25

(4) The cost of the 1982 Proceedings (£1172) was paid in March 1984

(5) Field Committee grant of £30.00 to be returned in 1984

STATEMENT OF ACCOUNTS FOR YEAR ENDED 31 DECEMBER 1983

1982			
	Members' Subscriptions:		
2491	Full members	2394.50	
268	Full members of the same household	263.75	
50	Corresponding members	45.50	
24	Associates	4.00	
6	Junior	6.00	
42	Affiliated societies	29.25	2743.00
2881			
32	Donations		12.00
35	Proceedings: Grant	35.00	
92	: Sales	61.18	96.18
-	Field Committee, profit on meetings plus grant	122.89	122.89
43	Sales of journals, books and membership lists		51.78
	Buffet supper: profit (£34.03), outstanding account (£38.00)		72.03
125	Interest on deposit account		116.88
3	Interest from National Savings Bank		2.90
17	Interest and premium on Bonds		16.50
16	Members' contributions to the Harry Savory Illustrations Fund		-
16	Members' contributions to the Conservation Appeal		71.00
100	South Brecon Field Study Centre donation		-
-	Members' contributions to the Dr A.F. Devonshire Memorial Fund		161.60
49	Return of Mammal Section balance		-
1119	Balance from last account		1297.13
£4528			£4763.89

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GENERAL & SECTIONAL PROCEEDINGS

REPORT OF THE BOTANICAL SECTION, 1983

At the Annual General Meeting, held in the Schools Room of the City Museum on 24 January 1983, the following were elected:- President: Dr A.F. Devonshire; Hon. Secretary & Treasurer: Mr A.C. Titchen; Committee: Miss I.F. Gravestock, Mrs N. Vaughan-Davies, Mrs M.A. Silcocks, Mr P.J.M. Nethercott, Dr M.C. Smith, Dr C.M. Lovatt, Mr C.W. Hurfurt, Mr A.L. Grenfell and Mr R.M. Payne. With regret we must record the death, on 27 April 1983, of our President, Dr Devonshire: an obituary is to be found on page 10. The Lady Rosemary FitzGerald very kindly accepted an invitation to succeed Dr Devonshire in this office.

The following winter meetings were held:

24 Jan	Annual General Meeting, followed by Members' Evening.
28 Feb	"An Interest in Plant Photography", by Professor J.H. Fremlin.
21 Mar	"Carnivorous Plants", by Mr A. Slack.
24 Oct	Members' Evening with transparencies.
21 Nov	Symposium - Botanical books, past and present.
12 Dec	"It must have been that", by Mr D.E. Allen.

The following field excursions took place, under the leadership of those shown:

24 Apr	The Cotswolds, Mr A.L. Grenfell.
14 May	Portishead, Mrs M.A. Silcocks.
11 Jun	Ham Woods, nr Shepton Mallett, Miss I.F. Gravestock.
13 Jun	Portbury, Lady Rosemary FitzGerald.
21 Jul	Castle Green, Mr A.C. Titchen.
30 Jul	Wick & Grandam Rocks, Mr P.J.M. Nethercott.
3 Aug	Trees & Shrubs in Clifton, Mr A.C. Titchen.
20 Aug	Mendip Ferns, Mr R.M. Payne.
3 Sep	Kennett & Avon Canal, Bath, Mr P.J.M. Nethercott.
10 Sep	Royal Horticultural Society gardens Wisley, Mr A.C. Titchen.
23 Oct	Fungus Foray - Long Wood & Charterhouse, Mr J.G. Keylock.
19 Nov	Bryophytes of Ebbor Gorge, Mendip, Mrs J. Appleyard.

A.C. TITCHEN, Hon. Secretary

REPORT OF THE ENTOMOLOGICAL SECTION, 1983

At the Annual General Meeting held on 5 January 1983, the following officers were elected: President: Mr R.M. Payne; Hon. Secretary: Mr G.W. Sorrell; Hon. Treasurer: Mr R.W. Rowe; Committee: Mr H.K. Barton, Mr G.R. Best, Mr R.S. Cropper, Dr K.W. Miller, Mr A.R. Nichols, Mr K.H. Poole, Mr R.H. Poulding, Mr L.S. Way and Mr A.H. Weeks.

The winter programme included the following indoor meetings:

5 Jan	Annual General Meeting & Members' Exhibits.
11 Feb	Symposium on Entomological Breeding Techniques.
10 Mar	Recorders' and Field-work Discussion Evening.
13 Oct	Exhibition & Members' Evening.
10 Nov	"Something Stirred in the Dark", by P. Chapman - an illustrated talk on insects and other fauna in tropical caves.
15 Dec	Insect Mimicry & Camouflage - a symposium by a panel of speakers.

Field excursions arranged as part of the summer programme:

22 May	Shapwick Heath, Mr H.K. Barton.

18 Jun	Cadbury Camp, Tickenham, Mr A.J. Weeks.
2 Jul	Compton Dando, Mr R.M. Payne.
6 Aug	Wetmoor Nature Reserve, Lower Woods, Mr H.K. Barton.

In addition, six survey meetings took place at Middle Hope, nr Weston-super-Mare at the invitation of the National Trust. Other National Trust sites were surveyed by individual members during the year.

The Section has had a successful year with up to thirty members attending indoor meetings but, again, numbers at field excursions were disappointingly low due in part to unfavourable weather on several dates.

G.W. SORRELL, Hon. Secretary

REPORT OF THE GEOLOGICAL SECTION, 1983

The following officers were elected at the Annual General Meeting held on 19 January 1983: President: Dr A.B. Hawkins; Vice-President: Mr P. Thomson; Hon. Secretary & Treasurer: Mrs G.B. Castle; Field Secretary: Dr D. Hamilton; Committee: Mr M. Curtis, Mrs M. Gray, Mrs G. Hamilton, Mr T. Harrison, Mr N. Hollingsworth and Mr D. Wilson.

The following winter meetings were held:

19 Jan	"Aspects of the Geology of Samoa", by Dr A.B. Hawkins.
16 Feb	"Chipping Sodbury Quarry", by Mr M.T. Curtis.
16 Mar	"Cool View of Hot Rocks: High Temperature Rocks of Arctic Norway", by Dr M. Bennett.
19 Oct	"Life in the Coal Measure Forests", by Dr A. Scott.
16 Nov	"Hot Dry Rock - Geothermal Energy Research in Cornwall", by Mr J. Beswicke.
14 Dec	"The Pleistocene Ice Ages in Britain", by Professor D. Bowen.

Four field trips were arranged as follows:

20 Mar	Chipping Sodbury Quarry, Mr M.T. Curtis.
24 Apr	Inferior Oolite of the Bridport Area, Mr H. Prudden.
29 May	Portishead-Clevedon Conglomerates & Shallow Water Carbonates, Dr D. Hamilton.
26 Jun	Mapping at Marston Road Quarry, Mr C. Copp.

GLORIA CASTLE, Hon. Secretary

REPORT OF THE ORNITHOLOGICAL SECTION, 1983

The Section held eleven indoor meetings, five of which were for beginners plus a joint fieldwork meeting with the Bristol Ornithological Club. Three of these meetings were adressed by visiting ornithologists and were particularly stimulating, the lecturers were Peter Hayman, Mike Smart and David Boag. A total of thirty two fieldwalks were arranged with an average attendance of ten members: a fine spectrum of bird species were recorded. The weekend trip to West Wales was very successful with some fine sightings of the seabird colonies.

A number of national and local surveys were undertaken by the Section. The national ones included (i) the BTO Buzzard Survey, (ii) the BTO Mute Swan Census, (iii) the continuing BTO Winter Atlas project, (iv) the BTO Nest Record Scheme, (v) the Birds of Estuaries Enquiry and Wildfowl Counts. Local enquiries included (i) Birds in Gardens, (ii) Overwintering Warblers,

(iii) Breeding of Skylarks and Meadow Pipits, (iv) a Woodland Survey, (v) a Study of the Barn Owl, (vi) Birds in City Parks, and (vii) a tetrad survey associated with the Winter Atlas Project. Most of these projects were undertaken jointly with the Bristol Ornithological Club.

The 1982 Avon Bird Report appeared in September in a similar form to those of the previous three years. This is the last edition to be published under the sole auspices of the BNS. During the year negotiations, now successfully completed, have resulted in the establishment of the Avon Ornithological Group jointly sponsored by the BNS and the Bristol Ornithological Club with the aim of producing the Avon Bird Report beginning with the 1983 edition. Council has agreed to provide each member with a copy of the Report as it will no longer appear in the main part of the *Proceedings* of the Society. The Report will deal with the status and distribution of the birds of Avon and include both a systematic list and contributed papers.

The slight decline in attendance and membership noted last year continued in 1983; the Ornithological Committee is investigating the reasons which seem to be complex. Nevertheless the Section had a successful year with some good results achieved, particularly in the fieldwork area, and we confidently hope for similar results in 1984.

H.E. ROSE, Hon. Secretary.

OBITUARY: ALBERT FREDERICK DEVONSHIRE (1911-1983)

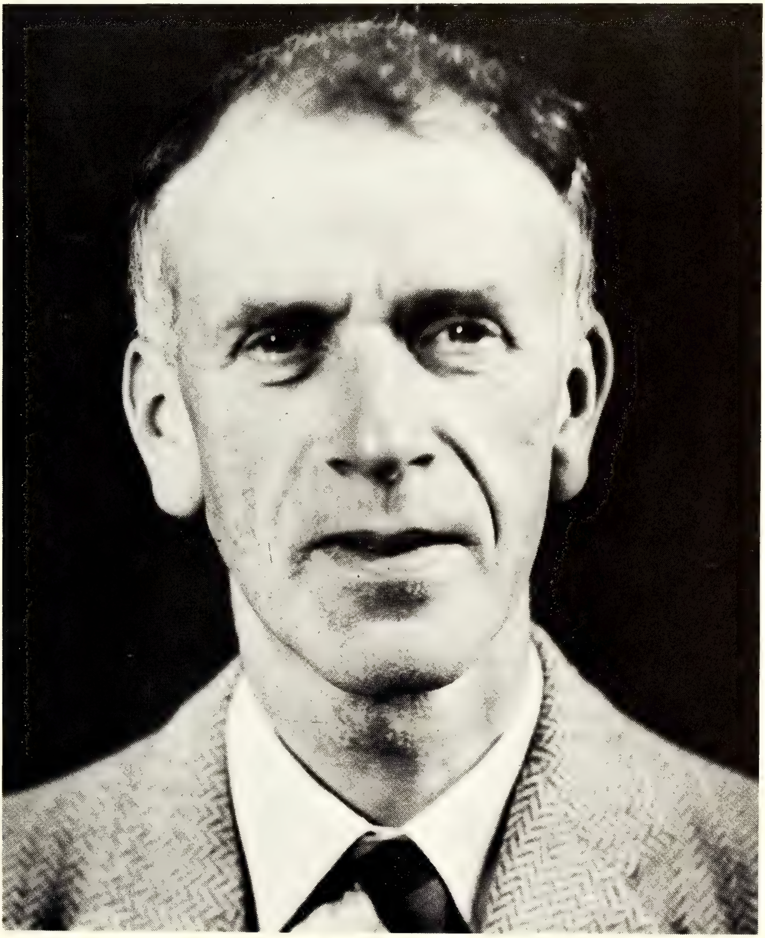
Albert Frederick Devonshire, M.A., Ph.D., was born on 30 October 1911 at Handsworth, Birmingham. He was educated at King Edward VI School, Birmingham and entered Trinity Hall, Cambridge in 1930 where he graduated with First Class Honours in the Mathematics Tripos. After several years in research at Cambridge he received his Ph.D. in 1937. During the War he carried out research work at the Ministry of Supply and Ministry of Aircraft Production. He came to Bristol in 1945 to the Department of Physics of the University where he served first as a research assistant and from 1951 as a lecturer until his retirement in 1976. More information about his University career appears in the University's Newsletter of 12 May 1983. He died on 27 April 1983 at Frenchay Hospital following an unfortunate accident.

He joined our Society in 1945 and was soon involved with its meetings and management. He was first a member of Council in 1948. His long association with the Field Committee began when he was elected a member in 1949, becoming Secretary in 1957 in which capacity he served until his death. His foremost interest was botany and again he was long associated with the Botanical Section Committee, becoming President of the Section in 1971 and so serving until his death. He was President of the Society for the year 1965.

Dr Devonshire was known to just about everybody in the Society, notwithstanding the Society's highly sectional structure. Between the years 1949 and 1982 he led, either solely or jointly, just over one hundred field meetings, general or botanical, for the Society, the last being the visit to Westonbirt Arboretum in October 1982. He gave several lectures in the same period, mostly on botanical themes. As Field Secretary he had the arduous duty of planning the general field meetings for each year and liaising with the Sections to avoid as much as possible the overlapping of meeting dates.

But the listing of offices held and services performed by him for so long and distinguished a period is not for what he will be most readily remembered.

Whether Dr Devonshire was leading a meeting himself or attending one under another's leadership, his ability to communicate with those present, his kindness and patience with member's questions and his wide knowledge of field subjects, all assured the pleasure of the occasion. He, unwittingly, often focussed attention upon himself when on another's meeting, - at some little distance behind the leader he would observe and remark on something seen and would attract around him a body of questioning members, - he was, after all, quite likely to be better informed and have something more interesting to say than the leader (who could be thankful that some of the burden was shouldered by a fellow-member so competent). Dr Devonshire was very good on a wide range of subjects - antiquities, old buildings, but



Dr A.F. Devonshire

especially industrial history and archaeology. Who else could have dared to use for his botanical walks such entertaining titles as "The Thunderbolt Track", "Exploring the L.M.S." and "Round the Rails"?

He led meetings to all manner of places but he had a special liking for the Combes - Bourton, Brockley and Goblin, leading off Broadfield Down and for the Forest of Dean and the Wye Valley.

He was a regular contributor for most years between 1949 and 1980 to the Bristol Botany paper in our *Proceedings*. His most notable discovery was of *Stratiotes aloides* L., the Water-soldier, in rhynes near Glastonbury in 1963. But as a botanist he tended to steer clear of the pursuit of rarities, critical species and aliens (much to the benefit of the majority of members who wanted to learn about and be introduced to the common and not so common plants of the countryside).

He was an individual contributor, and co-ordinator within the Society of members' records, to the *Atlas of the British Flora* project of the Botanical Society of the British Isles for the "squares" ST 57, ST 56 and ST 66 in the years 1955-58. He also contributed substantially to Captain R.G.B. Roe's *The Flora of Somerset* (1981). He was a member of the B.S.B.I. from 1958.

He lived at 59 Falcondale Road, Westbury-on-Trym where he cultivated a small garden which was devoted to a variety of unusual plants and which he was delighted to show friends. Members of the Field Committee, meeting at his house in January, were often invited to view the *Cyclamen* in his garden by torchlight!

He was also a member of several kindred societies including The Woodland Trust. Council opened to our members a Memorial Fund to be applied to The Woodland Trust and over £300 was contributed.

He was a keen chess player. His membership of the Bristol and Clifton Chess Club was a long one and he was twice its President.

I am grateful to his niece, Mrs A. Taylor of Alcester for information about his early life.

P.J.M. NETHERCOTT

Proceedings of the Bristol Naturalists' Society (1983), **43**: 13–27.

NATIVE SULPHUR FROM STANCOMBE QUARRY, FLAX BOURTON & DAN-Y-GRAIG QUARRY, RISCA (S. WALES)

by C. ALABASTER

(Department of Geology, University of Bristol)

ABSTRACT

Crystalline, native sulphur (α-sulphur) occurs as a supergene alteration product of galena at both Stancombe quarry (in a mineralised cave in the Carboniferous Limestone) and Dan-y-graig quarry (galena veins in the Carboniferous Limestone). The primary, hypogene, assemblage includes galena, pyrite, sphalerite, barite, calcite, and in addition, marcasite, dolomite and chalcopyrite at Dan-y-graig. Secondary minerals include cerussite, anglesite, α-sulphur, calamine, secondary galena, a yellow Sb-rich powder, together with greenockite (Stancombe) and hydrozincite, cadmian calamine and secondary Cu-minerals (Dan-y-graig). Anglesite and sulphur exhibit an inverse relationship, sulphur being far more abundant at Dan-y-graig than at Stancombe. The relationships between the sulphur and the other secondary minerals are described; the modes of occurrence and crystal habits of the sulphur at both localities are contrasted. Fluid inclusion data suggest a temperature of formation of <50°C. The sulphur is currently forming, as a result of the chemical leaching of galena by highly acidic Fe^{3+} bearing groundwaters, resulting from bacterially-assisted oxidation of disseminated pyrite adjacent to the galena.

INTRODUCTION

Stancombe quarry (505684), situated on the northern side of the Broadfield Down anticline, is opened in gently dipping (17-20°N) well jointed and bedded L. Carboniferous Clifton Down Group Limestones. The hypogene mineralisation consists of a few narrow (max 30 cm wide) subvertical calcite-barite veins (± galena/sphalerite/pyrite), and a large infilled mineralised cave which contains a similar primary mineral assemblage to the veins. The cave, from which most of the sulphur was obtained, is developed parallel to the bedding of the limestone; it intersects the present day ground surface at +160m OD, just behind the southern lip of the quarry and can be traced down to the third level, ~30m lower. At this point, the cave follows the strike of the limestone for about 25m, varying in height from about 4m at the eastern end to ~1.4m at its western extremity. Fill primarily consists of brown-grey iron oxide-stained stratified clay with thin (10cm max) concordant bands of coarsely crystalline calcite, and white fibrous barite. Scattered throughout the barite are minute (typically 0.01-1mm diameter) eu/anhedral pyrite grains, and 0.5-1cm diameter skeletal/arborescent galena crystals. At the eastern end of the cave (on level 3) galena occurs as continuous bands and less commonly, isolated pods of massive ore. The latter range from a few dm^3 to c. $\frac{3}{4}m^3$ in volume. The ore pods are surrounded by white barite and coarsely crystalline calcite, in turn set in the laminated clay. Small euhedral crystals and larger crystalline masses (max 2cm longest dimension) of dark brown sphalerite are randomly distributed throughout the massive galena.

The galena pods are riddled with cracks, small vughs and solution channels. The walls of these open spaces are invariably coated with colourless crystalline anglesite ± cerussite, which may be accompanied by α-sulphur, calamine, an unidentified yellow antimony-rich powder and rare greenockite. In a few cases, the crystalline alteration products are separated from the unaltered galena by a 0.1-3mm thick layer of compact, grey-brown colour-banded anglesite which may locally contain disseminated or crystalline sulphur. A very similar association of sulphur and colour-banded anglesite was found in brecciated galena from the Ivanhoe Pb-Ag mine, British Colombia (Walker & Parsons, 1930).

Dan-y-graig quarry (234908; disused) is situated on the S.E. margin of the S. Wales coalfield and worked dolomitized limestones belonging to the lower and middle divisions of the Main Limestone (roughly equivalent to the Black Rock Group of the Bristol district). In the quarry area massive, gently dipping (35-40° N.W.) poorly bedded grey dolomitized limestones are overlain by about 5m of vughy brown dolomites, in turn succeeded by at least 20m of thinly bedded pyritic limestones interbedded with black pyritic shales. The hypogene mineralization consists of thin stringers and veins of galena which cut both the dolomitized limestones and the pyritic shale-limestone unit. Vughs within the brown dolomites contain a similar primary mineral assemblage to the veins (galena, barite, calcite) and additionally dolomite, pyrite, marcasite, rare chalcopyrite and sphalerite. The secondary minerals within the vughs include iron oxides, secondary copper sulphides and carbonates, calamine, and white-grey colour-banded hydrozincite. Secondary alteration and rotting of the galena veins has occurred to a far greater extent than at Flax Bourton and, with the possible exception of greenockite, an identical secondary mineral assemblage has developed.

SECONDARY MINERALS

YELLOW Sb-BEARING POWDER

At both Stancombe and Dan-y-graig quarries, the yellow antimony bearing powder is widely distributed throughout the rotted galena. At Stancombe quarry it commonly occurs as earthy coatings on barite crystals in cavities adjacent to the galena pods. With the exception of greenockite at Stancombe quarry the yellow powder is variously found to encrust any of the other secondary minerals; at Stancombe quarry it also occurs as bright yellow bands within the banded anglesite. XRD analysis of samples from both localities show it to consist almost entirely of a variable mixture of cerussite and anglesite. One or two small peaks, corresponding to one or more additional minor phases occur on some of the XRD traces, but these peaks could not be ascribed to any one specific mineral. Microprobe analysis proved antimony and iron to be the major impurities, with minor cadmium, silicon, germanium, and aluminium. Chemical tests proved arsenic in one specimen from Stancombe quarry. These results suggest that the yellow colouration may be due to finely disseminated yellow "antimony ochre" (hydrated antimony oxide) which may be accompanied by yellow greenockite. The aluminium and silicon probably relate to admixed clay minerals. Chemical analyses of 12 samples of galena from the cave at Stancombe quarry and 4 specimens from Dan-y-graig show antimony contents varying between 0.2-0.4% Sb and 0.5-0.75% Sb respectively. At the nearby Ochwryth quarry (233898) Risca, a heavily rotted galena vein within the Main Limestone yielded a large quantity of this yellow powder in addition to minor sulphur. The antimony content of the galena ranges from 0.075-0.08% Sb (3 samples). About 20 years ago, approximately 1 tonne of antimony-rich galena (0.2-7%, 5 samples) containing small crystals of native sulphur was obtained from a clay-filled pocket near the entrance to Stancombe

Quarry (Carlton, 1959). No secondary antimony minerals were recorded from this material.

GREENOCKITE

At Dan-y-graig quarry, greenockite has not been recorded as a discrete mineral phase, although small amounts of the yellow, cadmium sulphide-bearing calamine occur in some of the vughs in the brown dolomites. At Stancombe quarry, greenockite occurs, very sparingly, both as orange powdery crusts on some of the altered sphalerite and adjacent galena/anglesite and in one case as small crystals (Plate 1,A) encrusting sulphur, sphalerite, barite and anglesite in a cavity in the altered galena. The cadmium content of the sphalerites in the galena pods ranges from 0.53-1.38% Cd (9 samples). Supergene activity has converted most of the sphalerite at Dan-y-graig to calamine; insufficient sphalerite was available for analysis. In the Bristol area, greenockite has previously been recorded in the form of yellow powdery crusts on sphalerite in mine spoil near Green Ore, Mendip (Kingsbury & Friend, 1939).

SULPHUR

At Stancombe quarry, sulphur is widely distributed, but in very small amounts, throughout the altered galena pods; approximately 2 tonnes of massive galena were broken up and hand sorted, yielding about 1000 sulphur crystals. The sulphur occurs in three main forms: as yellowish crystalline bands and/or finely disseminated powder (confirmed by CS_2 leaching) within the colour-banded anglesite; as euhedral-anhedral transparent-translucent crystals; and as 0.5-1mm diameter sugary or slaggy crystalline aggregates. The 'slaggy sulphur' consists of a variable mixture of sub-anhedral crystals and wiry blebs of transparent-translucent sulphur; these aggregates may encrust or be encrusted by large single euhedral sulphur crystals. The crystalline sulphur (including the slaggy variety) variously encrusts, or is encrusted by, any of the other secondary minerals with which it occurs, but neither replaces nor is replaced by any of these. Almost without exception (possibly one case) the point of attachment of the sulphur crystals is separated from the galena by a variable thickness of crystalline anglesite. In any one cavity, individual often euhedral sulphur crystals are not infrequently found to be totally or partially engulfed in water-clear, massive-euhedral crystalline anglesite; a further generation of sulphur crystals may be developed on top of the anglesite (Fig. 1A). Sulphur crystals directly encrusting sphalerite, without any intervening anglesite layer are not uncommon. In addition, a few small (0.5mm longest dimension) dipyramidal and grossly spherical sulphur crystals were found in a partially oxidized galena ore shoot in one of the hypogene veins. The relationships between the sulphur, anglesite and galena are in all respects similar to those which obtain within the mineralized cave.

At Dan-y-graig, native sulphur occurs sporadically but in much greater abundance than at Stancombe quarry. Almost all of the material for this study was obtained from a temporary exposure near the top of the quarry, at the contact between the brown dolomites and the limestone-shale unit. At this point, when sulphur is present it is usually the dominant secondary mineral; at greater distances below the dolomite/shale-limestone contact sulphur becomes less important, with anglesite ± cerussite ± the yellow antimony-bearing powder the dominant or only alteration products. No sulphur was found in any of the galena-bearing vughs but its absence may be more apparent than real. Within the rotted galena, sulphur occurs as greenish yellow-brownish yellow transparent-translucent crystalline disseminations, sheets, and discrete pockets (maximum diameter c. 2cm), which variously consist of aggregates of dipyramidal, distorted prismatic and faceted or coralline, dendritic crystals. Sulphur pockets which also occur within the adjacent barite gangue appear to represent isolated grains of galena which have been totally altered to sulphur. Relationships between the sulphur and anglesite/cerussite are very similar to those which obtain at Flax Bourton.

In the early stages of breakdown, alteration of the galena with the formation of sulphur principally occurs along the cleavages and at grain

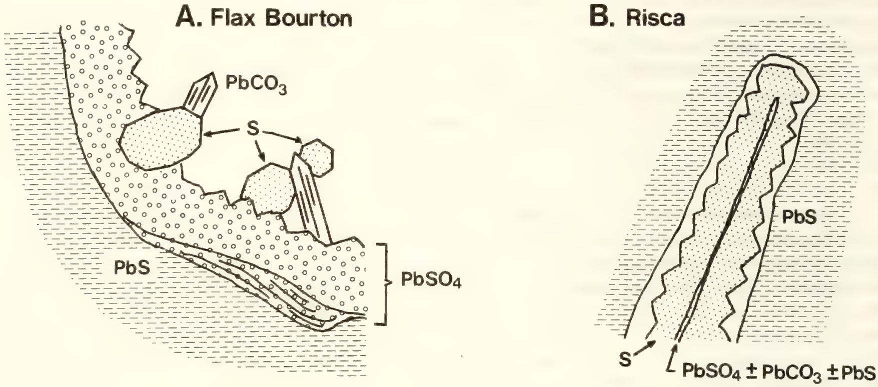


Figure 1. Characteristic modes of occurrence of sulphur at Stancombe and Dan-y-graig Quarries.

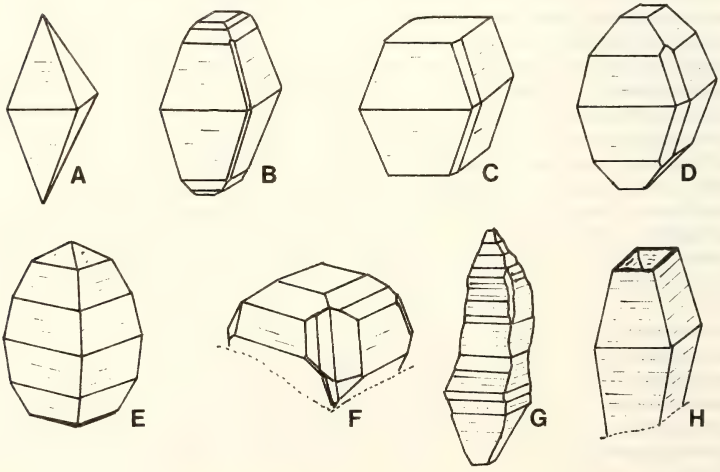


Figure 2. Sulphur crystals, Stancombe and Dan-y-graig Quarries.

boundaries. Along the galena cleavages, sulphur occurs as crystalline sheets which have grown outwards from both sides of a thin (0.1-0.5mm) central lamella comprising of a mixture of anglesite ± minor cerussite ± finely disseminated residual galena (Fig. 1B). At grain boundaries, growth tends to be from one side only, with the crystals directed inwards towards the decomposing grain (Plate 3,E,G). The surface of the sheets show euhedral crystal form, principally squat, simple dipyramids (Fig. 2,A,D,E,H) with a few more complex crystals (Plate 1,B). The crystals range from c. 0.05-0.5mm longest dimension. As a rule the crystal terminations do not touch the walls of the enclosing cavity, but the form of the cavity often closely corresponds to the surface topography of the crystalline sheet. The walls are frosted and heavily corroded but usually have no discernible anglesite or cerussite coating. As alteration proceeds, and the cavities become larger, squat dipyramids give way to elongated dipyramids and distorted prismatic crystals; some of the latter type are bifurcated. Hopper crystals, showing a deep narrow internally-faceted depression on (001), or parallel to the 'Z' axis (when (001) is not developed) are not uncommon (Fig. 1,H). In an advanced state of alteration, distorted prisms and dendritic, faceted and/or sinuous coralline crystals are the dominant form; the dendritic crystals may attain a length of up to 3mm. At this stage much of the galena has been destroyed or reduced to a spongy mixture of residual and/or secondary galena, sulphur, cerussite and anglesite. Minute cubes of secondary galena also occur as dusty surface coatings on some of the prismatic or dendritic crystals; small amounts of secondary galena have also been found, at both Flax Bourton and Risca, encrusting euhedral bladed anglesite crystals, and also barite in Stancombe quarry, in cavities where little or no sulphur is developed. When most of the galena has been destroyed, some of the early formed sulphur-encrusted anglesite lamellae may remain to form a crude box-work structure, reflecting the cleavage directions of the original galena (Plate 3,E).

At Flax Bourton, the sulphur crystals are of three basic types, dipyramidal crystals of varying complexity (e.g. Fig. 2,A,B,C,E,F,G); grossly spherical crystals (Plate 1,A) and rare, 0.3-2mm long bladed or acicular crystals (Plate 2,F,G). The dipyramidal and spherical crystals range from about 0.1-1.5mm in diameter. At both Dan-y-graig and Stancombe quarries, the majority of the crystals show some degree of surface ornamentation, mainly growth ridges 1Z). At Stancombe quarry, minute prismatic and/or pyramidal overgrowths may occur on any of the three basic crystal types; overgrowths are not a common feature of the Risca crystals. In a few cases, the grossly spherical, and also at Dan-y-graig the complex dipyramidal, crystals show development of groups of divergent curved striae (ridges or faceted steps Fig. 3) which may either be restricted to two or three adjacent faces or sweep round a major part of the circumference of the crystal. Less frequently, low 'growth hillocks' (Plate 1E) may be developed and tend to be restricted to single crystal faces. No curved striae or growth hillocks were seen on any of the prismatic crystals from either locality. These features appear to be surface manifestations of crystal lattice defects which developed during crystal growth. Spiral growth dislocations have been previously recorded from natural sulphur crystals (Emara, 1961). The spirals are accompanied by groups of sweeping curves which are very similar in appearance to some of those noted in this study; no spirals were seen on any sulphur crystals from either Risca or Flax Bourton.

At Stancombe quarry, prismatic crystals are very rare, and only ten examples were found. These crystals are of two basic types; elongated distorted dipyramids in which only four of the eight faces have developed (giving rise to the prismatic habit, Fig. 4), and twinned crystals. The twins appear to be formed from two of the distorted dipyramids (Fig. 5); the composition plane is parallel to the length of the crystal but in most cases no re-entrant angles are visible. No angular measurements were obtained on the components of the twin; it is thus not possible to define the crystallographic orientation of the twin plane. These twins do, however, resemble the (011) twins, involving two dipyramidal sulphur crystals, figured in Palache *et al.* (1951 vol 1, 141). The prismatic crystals are accompanied, in

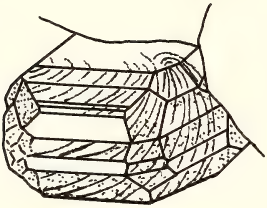


Figure 3. Curved striae on a sulphur crystal. Stancombe Quarry.

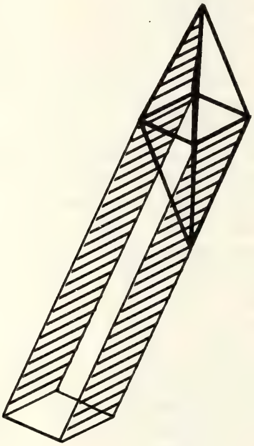


Figure 4. To show the development of the prismatic habit from a simple dipyramidal sulphur crystal.

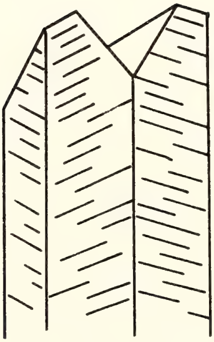


Figure 5. Bladed, prismatic sulphur crystal resulting from the twinning of two distorted dipyramidal crystals.

the same cavity, by 'normal' dipyramids, sometimes elongated due to oscillatory growth (Fig. 1G) and less commonly, grossly spherical crystals. In one case, a grossly spherical crystal was found encrusting the termination of a single-crystal prismatic.

FLUID INCLUSION STUDIES

The majority of the sulphur crystals from both localities contain fluid inclusions. These take the form of negative crystals, (Plate 3A), sinuous branching tubes (Plate 3D) or rounded bubbles (Plate 3C). At Stancombe quarry, negative crystals predominate, whilst rounded elongated bubbles are the dominant type at Dan-y-graig. The negative crystals and bubbles vary from 5µ to about 0.15mm in diameter; the cloudiness of many of the crystals is probably due, at least in part, to the presence of vast numbers of minute fluid inclusions. Many of the sulphur crystals from Flax Bourton show the development of deep, narrow irregular, internally faceted shafts of similar dimensions to the fluid inclusions (Plate 2C). Similar shafts have been noted on sulphur crystals from Brezhane, Bulgaria and were interpreted as solution features (Maleev, 1976). In the present case, the internal faceting of the cavities suggests that they are incipient negative crystals. Under the S.E.M. minute pits can be seen on the surface of many of the dendritic crystals from Dan-y-graig (Plate 2B); these pits may have a similar origin. At Stancombe most of the fluid inclusions have no preferred orientation relative to the host crystal; at Dan-y-graig many of the elongated dipyramidal, prismatic and dendritic crystals contain a string of bubbles or a single sinuous tube running the entire length of the crystal (Plate 3B). At this locality it is found that, on average, the squat dipyramids contain relatively few inclusions whereas the distorted prismatic and dendritic crystals contain the most; the coralline dendritic crystals are invariably riddled with bubbles.

Without exception the fluid inclusions from both localities consist of a single-phase fluid. On the hot stage microscope, a freezing point depression of 0.2°C and 0.25°C was recorded from two separate inclusions from Stancombe quarry, whilst four inclusions fron Dan-y-graig gave depressions of -2°C, -0.5°C, -0.4°C and -0.1°C. Apart from ice, no other phase formed on cooling. These results are consistent with an aqueous fluid having a very low total-dissolved-solid content. A partial chemical analysis of inclusion-bearing and inclusion-free crystals from Flax Bourton indicates up to 2ppm Pb and 1ppm Fe in the fluids (A. Lock, pers. comm.); this is insufficient to account for the observed freezing point depression.

Although the precise composition of the fluid is not known, some idea of the concentration of dissolved ions or total salinity can be obtained by comparing the observed freezing point depression with published tables for salinity vs depression of freezing point, for sea water (Weast, 1976; D249). This indicates salinities in the range 3.5-4.5$^{o}/_{oo}$ for Stancombe, and 1.75-37.5$^{o}/_{oo}$ for the Dan-y-graig crystals. No carbon, nitrogen or hydrocarbon was found in any of the crystals from either locality. Microprobe analysis of inclusion-free crystals from both localities revealed no detectable metallic impurities (though selenium and tellurium are sometimes found as impurities in native sulphur). Attempts to obtain a qualitive analysis of the fluids from Flax Bourton crystals using a mass spectrometer were unsuccessful; this appears to be due to the high levels of sulphur which 'masked' the low-level impurities.

It is not possible to say at what temperatures the fluids were entrapped. The absence of monoclinic β-sulphur from either locality indicates that at no stage during crystal growth did the temperature rise above 96°C, the transition temperature between α and β-sulphur. Under favourable conditions, the oxidation of a thick pile of pyritic shales can generate sufficient heat to cause the spontaneous combustion of included bituminous material. Although a sizeable excavation was made at Risca in order to collect samples for this study, there was no noticeable warmth in the decomposing shales. Elemental sulphur does not long survive in a near-surface, damp, well-oxygenated environment. For this reason, it is likely that the process of sulphur generation is continuing at the present time. The oxidation of galena to anglesite can proceed at ambient temperatures; the relationships between the sulphur and anglesite at both Stancombe and Dan-y-graig show that both minerals were forming at the same time. It is thus not unreasonable to suggest that the sulphur crystal-forming processes were operating at a fairly low temperature, perhaps 50°C or less. The fluid inclusion data are in accord with this conclusion (T. Sheppard, pers. comm.).

DISCUSSION

In the natural environment, elemental sulphur can be formed in a wide variety of ways (Palache *et al.*, 1951; Ruckmick *et al.* 1979; Erlich, 1981). At both Risca and Flax Bourton, the intimate association of sulphur with galena and anglesite, the restriction of its occurrence to the immediate

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PLATE 1 (FACING PAGE) (A) *Grossly spherical sulphur crystal. Stancombe Quarry.* (B) *Sulphur crystal. Dan-y-graig Quarry.* (C, D) *Dendritic sulphur crystals. Dan-y-graig Quarry.* (E) *Growth hillock, restricted to a single face on a grossly spherical sulphur crystal. Stancombe Quarry.* (F) *Divergent, curved striations on the surface of a grossly spherical sulphur crystal. Stancombe Quarry.*

PLATE 2 (PAGE 22) (A) *Crystals of greenockite on barite, accompanied by small rosettes of barite. Stancombe Quarry.* (B) *Dendritic, coralline sulphur crystals. Small pits on the crystal surface may represent incipient negative crystals. Dan-y-graig Quarry.* (C) *Internally faceted shaft which, in this specimen, extends right through the sulphur crystal. Stancombe Quarry.* (D) *Bladed prismatic sulphur crystal, showing orientated intergrowths. The crystal is a twin, of the type shown in Fig. 5. Stancombe Quarry.* (E) *Sinuous, coralline sulphur crystal. Dan-y-graig Quarry.* (F) *General view of prismatic, twinned sulphur crystal 'D'. Stancombe Quarry.* (G) *Acicular sulphur crystal showing surface pits (incipient negative crystals) and overgrowths. The longitudinal situations are an optical effect, not surface ornamentation.*

PLATE 3 (PAGE 23) (A) *Negative crystal in a sulphur crystal. Stancombe Quarry.* (B) *Sinuous dendritic sulphur crystal, showing fluid inclusion down the centre of one branch (arrowed); the termination of the other branch is encrusted by secondary galena. Dan-y-graig Quarry.* (C) *Sheet of fluid inclusions within a sulphur crystal. The largest bubbles occur closest to the crystal surface. Stancombe Quarry.* (D) *Sinuous branching tube-like fluid inclusions in sulphur. Stancombe Quarry.* (E) *Galena almost completely replaced by sulphur. The box-work structure is composed of thin lamellae of anglesite, encrusted on both sides by sulphur. Dan-y-graig Quarry.* (F) *Coralline aggregate of sulphur crystals (similar to 'B') in a cavity in altered galena. Dan-y-graig Quarry.* (G) *Detail of 'E' (arrowed) showing sulphur crystals growing inwards towards a heavily corroded residual mass of galena. Dan-y-graig Quarry.* (H) *"Hopper" sulphur crystals. Dan-y-graig Quarry.*

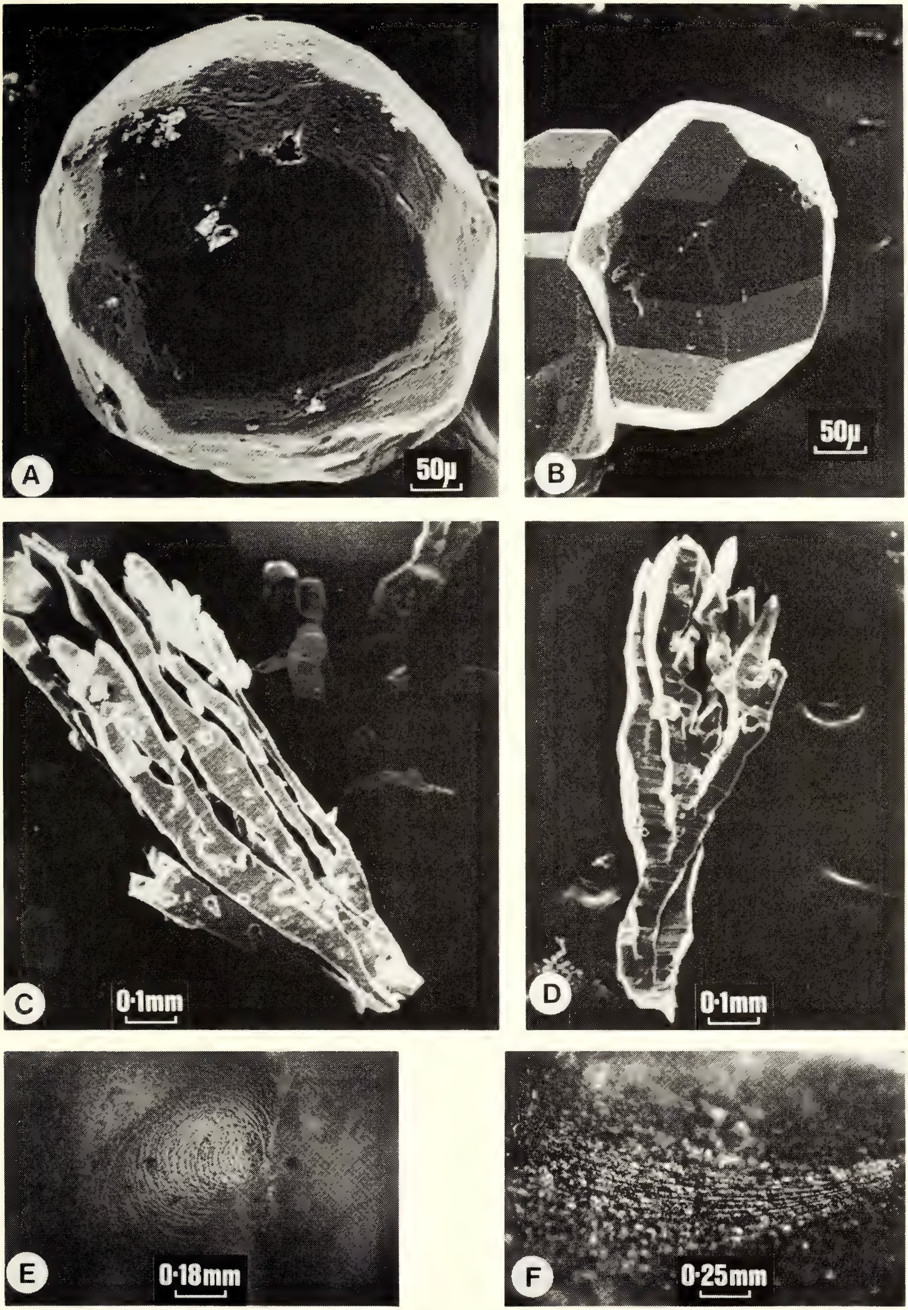
A
50µ
B
50µ
C
0·1mm
D
0·1mm
E
0·18mm
F
0·25mm

PLATE 1

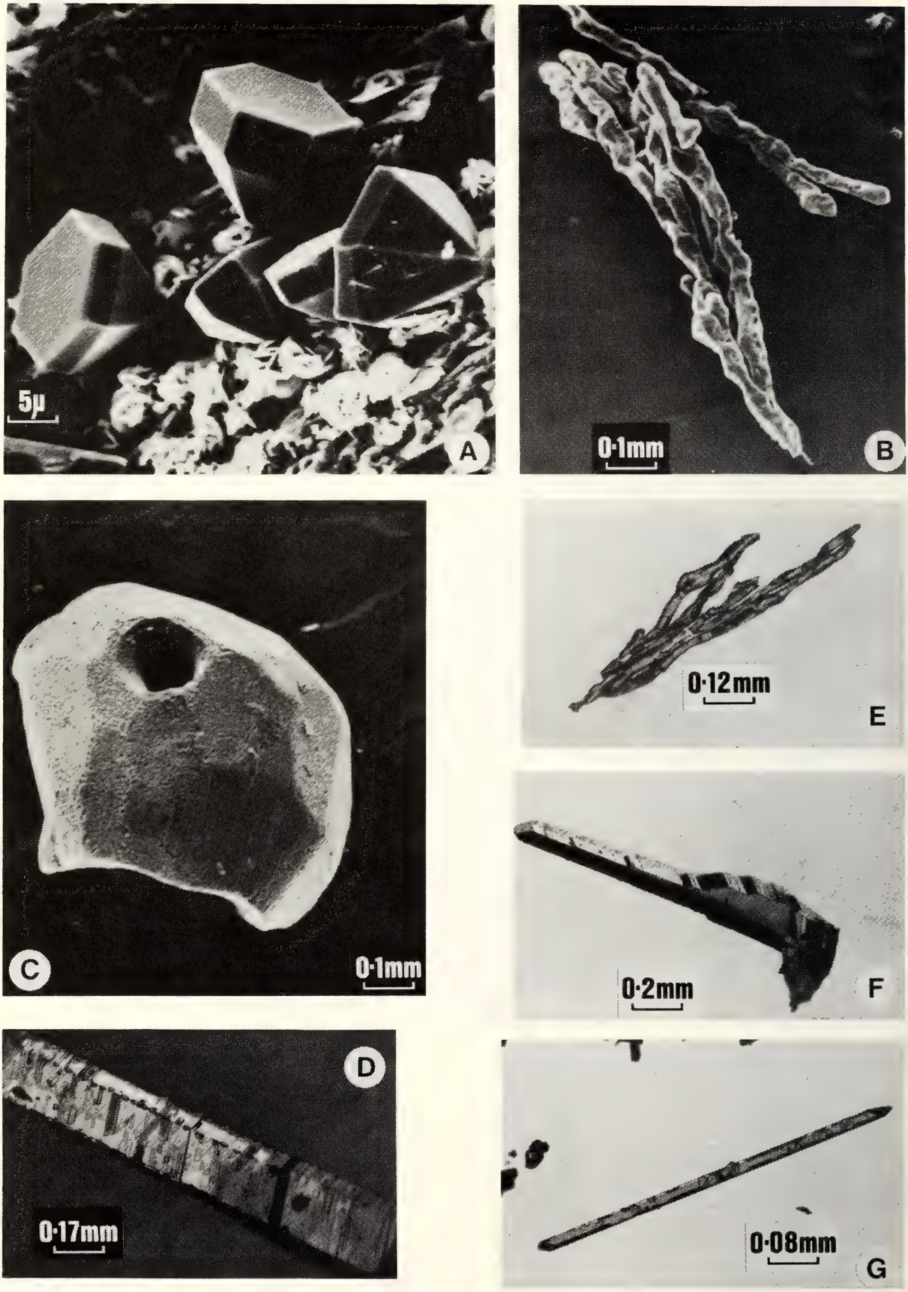
5µ
A
0·1mm
B
C
0·1mm
0·12mm
E
0·2mm
F
D
0·17mm
0·08mm
G

PLATE 2

NATIVE SULPHUR FROM FLAX BOURTON & RISCA (S. WALES)

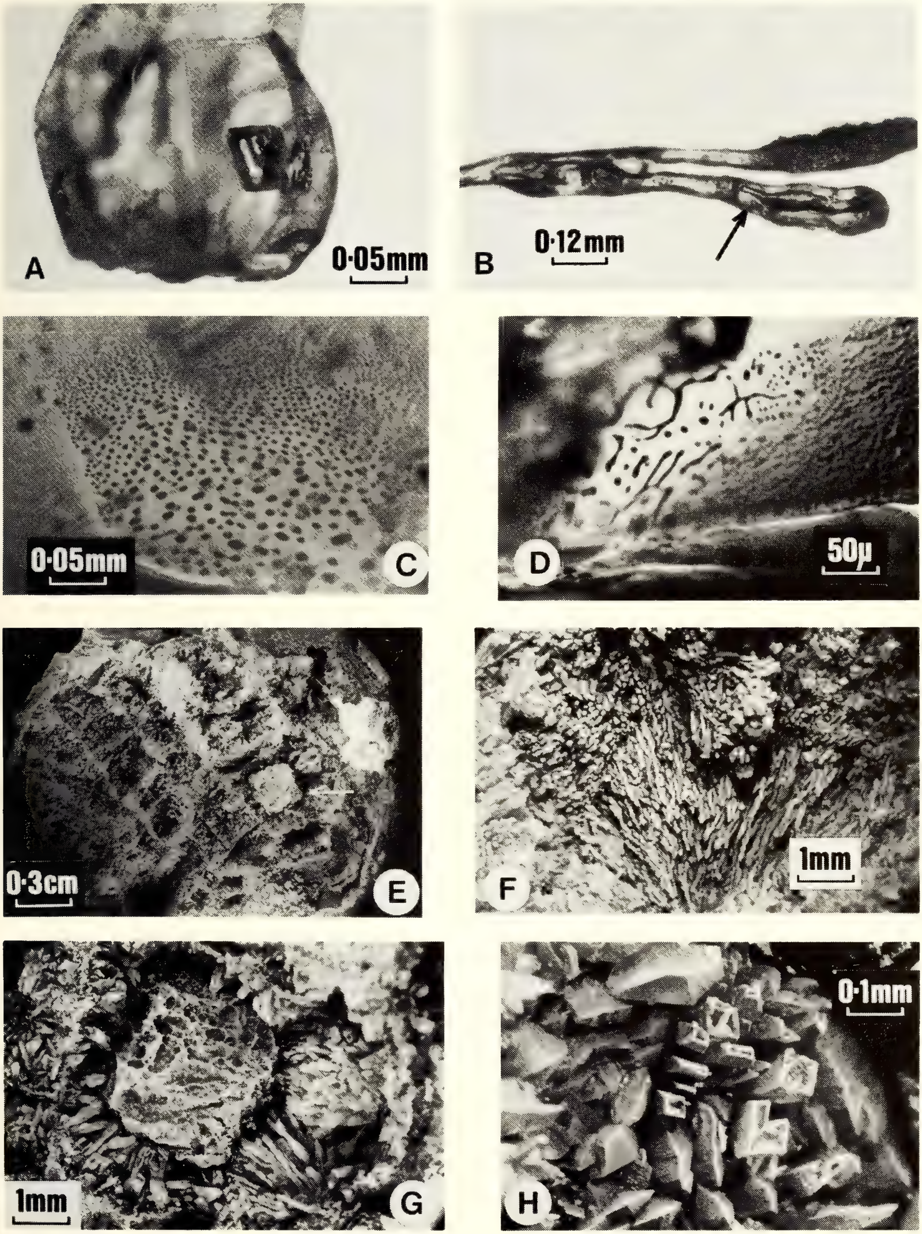
0·05mm
A
0·12mm
B
0·05mm
C
D
50µ
0·3cm
E
F
1mm
1mm
G
0·1mm
H

PLATE 3

vicinity of the galena and the absence of sulphur as a coating along the fractures or joints in the adjacent wall rock and gangue indicate that the sulphur was formed as a result of the alteration of the galena and was not introduced from some external source. With this in mind, and assuming a crystallization temperature of $<50^{\circ}C$, two mechanisms for the formation of sulphur from galena are theoretically available: (a) direct bacterial attack on galena; (b) acid leaching by trivalent iron-bearing groundwaters.

BACTERIAL ATTACK

Bacteria are highly adaptive organisms and have been recorded from environments that are hostile to all other forms of life. One of the most widely distributed groups of bacteria are the Thiobacilli, most of which are capable of oxidizing organic or inorganically bound sulphur to sulphate thereby obtaining energy for growth. One member of this group, *T. ferrooxidans* (a rod-shaped bacillus, about 1μ in length, first isolated from acid, coal-mine drainage water) can also obtain energy by oxidising ferrous iron to the ferric state in an acidic aqueous medium. *T. ferrooxidans* is an aerobe, requiring nitrogen in a soluble form (although one strain can fix atmospheric nitrogen), phosphate, various trace elements, an acidic environment (pH 2-3.5), a temperature not in excess of $35^{\circ}C$ ($25^{\circ}C$ optimum) and CO_2 as its source of carbon (Brierly, 1978). Under laboratory conditions, *T. ferroxidans* can be induced to catalyse the oxidation of galena to anglesite, thereby obtaining energy for growth. In the absence of iron (Fe^{2+}) lead sulphate is the sole product; the addition of small amounts of Fe^{2+} to the culture medium results in the formation of lead sulphate and, minor, sulphur (Tomizuka and Yagisawa, 1978). At both Risca and Flax Bourton pyrite would serve as a source of acidic, iron-bearing groundwater. The absence of carbon, nitrogen or any organic compounds from the sulphur crystals suggests that direct attack on the galena by this organism has not occurred. Furthermore, the absence of organic compounds rules out the liklihood of any other mechanism of sulphur generation involving direct bacterial attack on galena or sulphate in solution (cf Kelly *et al.*, 1969)

CHEMICAL LEACHING BY Fe^{3+}

In the natural environment, acidic Fe^{3+}-containing solutions can be generated from pyrite:-

$$(1) \quad FeS_2 + 7/2O_2 + H_2O \rightarrow FeSO_4 + H_2SO_4$$

$$(2) \quad 2FeSO_4 + \tfrac{1}{2}O_2 + H_2SO_4 \rightarrow Fe_2(SO_4)_3 + H_2O$$

Both reactions will proceed, in air, by purely abiotic means, but under these conditions equation '2' is very slow. At temperatures of $<40^{\circ}C$ the acidic conditions generated in equation '1' can provide an environment which is suitable for growth of iron oxidising bacilli such as Metallogenium (viable pH range 3.5-6.8) and *T. ferrooxidans*. *T. ferroxidans* are able to oxidise ferrous iron at a rate 500,000 times faster than would occur in their absence. Solutions containing trivalent iron are strong oxidising agents and will attack and break down a wide variety of metal sulphides including galena. When a metal sulphide (MS) is immersed in an acidified ferric iron solution, dissolution of the sulphide can proceed simultaneously by two separate pathways:-

$$(3) \quad MS + 8Fe^{3+} + 4H_2O \rightarrow M^{2+} + SO_4{}^{2-} + 8H^+ + 8Fe^{2+}$$

(4) $MS + 2Fe^{3+} \rightarrow M^{2+} + 2Fe^{2+} + S^0$

Although thermodynamic data predict equation '3' as the overall reaction, in a strongly acidic medium oxidation often produces elemental sulphur and only a very small amount of sulphate. It thus appears that equations '3' and '4' may be regarded as alternative and competing pathways, each favoured by its own set of variables. Experimental evidence suggests that '3' is favoured by a high pH, '4' by low pH (Dutrizak and McDonald, 1974). Theoretically, the sulphur formed in equation '4' is metastable and should be oxidised thus:-

(5) $3M^{2+} + 4H_2O + 4S^0 \rightarrow MS + HSO_4^- + 7H^+$

In practice, this reaction is of very minor importance probably due to the hydrophobic character of elemental sulphur (Dutrizak and McDonald, 1974). The small amounts of secondary galena associated with the sulphur at Dan-y-graig and Stancombe may have been formed in this way. In a closed system, much of the Fe^{2+} (equation 4) is reoxidized to Fe^{3+} by metal tolerant strains of *T. ferrooxidans*. This forms the basis for the bacterially assisted method of leaching low-grade ores for the recovery of contained metals (Trudinger, 1971; Brierly, 1978). Additional acid can be generated by oxidation of some or all of the sulphur, in equation 4, by the action of various thiobacilli.

(6) $S^0 + 3/2O_2 + H_2O \rightarrow H_2SO_4$

At Risca, the greatest concentration of sulphur occurs in those parts of the veins at or close to the dolomite/shale-limestone unit. The pyritic shales would furnish highly acidic Fe^{3+}-bearing groundwaters during weathering. The superabundance of sulphur and relative scarcity of anglesite at this point may thus be the result of leaching under strongly acid conditions, favouring equation '4' as the dominant pathway. At greater distances from the pyritic shales, acid-consuming reactions involving the carbonate wall rocks and groundwater solutions derived therefrom would reduce the acidity of the Fe^{3+} leach solution, thus causing equation '3' to become the favoured pathway. This would explain the occurrence within the veins of pockets of anglesite with little or no accompanying sulphur.

At Stancombe, the concentration of pyrite, as minute crystals within the barite, is much lower than at Dan-y-graig. It is thus possible that the pH of the leach solutions was much higher than at Risca, resulting in a bias towards equation '3' with the formation of abundant anglesite and minor sulphur. The intimate association of pyritiferous barite with the fractured galena 'pods' would enable these reactions to occur without too much acid being lost through interactions with bicarbonate solutions/wall rock.

Theoretically, sulphur and anglesite could also be formed by reactions between galena and bacterially produced dilute sulphuric acid:-

(7) $PbS + H_2SO_4 \rightarrow PbSO_4 + H_2S$

Aqueous solutions of H_2S are unstable and are rapidly oxidized to colloidal sulphur on exposure to atmospheric oxygen:-

(8) $H_2S + \frac{1}{2}O_2 \rightarrow S^0 + H_2O$

In air, H_2S may be detected by its odour at a concentration of 0.002 mg/lit (Merk Index). No H_2S was detected during the collection of samples or when fluid-inclusion-bearing crystals were crushed. This suggests that sulphur formation via equations 7 and 8 did not occur, even on a very limited scale.

In a leach dump, elemental sulphur may accumulate as an insoluble microcrystalline coating on the reactive sulphide surfaces, thereby inhibiting further leaching. This sulphur build-up can be prevented or reduced by the action of *T. thiooxidans* and related organisms. At Risca, the presence of hopper and dendritic crystals and the abundance of fluid inclusions in the latter, attest to rapid crystal growth, no doubt at least in part due to a combination of strong leach solutions and the absence of an inhibitory sulphur or lead sulphate surface coating on the galena. Sulphur is insoluble in water; the sulphur crystals at both Dan-y-graig and Stancombe have grown from an aqueous medium whose composition does not include any water-soluble organic solvents. For galena, the general reaction (equation 4) may be considered to include the steps:-

$$(9) \quad PbS + H^+ \rightleftharpoons Pb^{2+} + HS^-$$

$$(10) \quad HS^- + 2Fe^{3+} \rightleftharpoons S^0 + 2Fe^{2+}$$

and further reactions between elemental sulphur and HS^- ions could produce water-soluble polysulphanes:-

$$(11) \quad S^0 + HS^- \rightarrow HS_n^-$$

where n may equal 2, 3 etc. (Ehrlich, 1981). Equations 9-11 thus provide a possible mechanism whereby elemental sulphur is taken into solution as soon as it is formed, transported away from the site of formation, possibly as HS_8^-, perhaps in response to a diffusion or electrostatic gradient, and subsequently oxidized by Fe^{3+}, to elemental sulphur (S_8 rings) at the sites of crystal growth. In this way crystalline a-sulphur and not colloidal sulphur would be formed.

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THE DISTRIBUTION OF SOME COMMON LICHENS IN THE BRISTOL REGION

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INTRODUCTION

In the past the occurrence of lichens in the Bristol region has only been reported in general terms, in the lichen floras of Somerset (Watson, 1930) and Gloucestershire (Knight, 1950). While certain areas within this region have received particular attention (e.g. Cleeve Combe, Somerset (Watson, 1930); the Avon Gorge, Bristol (Knight, 1950; Watson, 1924); the lead mines at Charterhouse, Somerset (Brown, 1973)), no detailed information exists on the distribution of lichen species within this area. The present work attempts to rectify this for a number of relatively common lichens which can easily be identified in the field.

SURVEY METHODS

The area investigated (Fig. 1) is the same as that used by J.W. White in *The Flora of Bristol* (1912) and approximately corresponds with the present county of Avon. Observations are localised to within 1km grid squares and, of the 2063 present, information is available from 423 squares representing approximately 20% of the total possible squares. Squares were selectively searched by identifying and concentrating on only suitable habitats. Accessibility determined which squares were dealt with, although an attempt has been made to create as uniform a distribution pattern as possible.

The species chosen for this survey range from crustose lichens living on or within their substratum, to foliose species loosely attached to their substratum and fruticose species where most of the lichen thallus projects into the atmosphere (Table 1). Species were also chosen to cover a range of substrate preferences, including epiphytic and saxicolous but excluding terricolous; some species show restriction to one substratum and others have more catholic tolerances. Some species have been chosen for their physical similarity with other species that inhabit the same substratum but differ in their known sensitivity to an environmental factor.

Species maps are presented in groups of four sharing some common linking feature. Seaward and Hitch (1982) provide maps of the distribution within the British Isles of some of the species dealt with here (Table 1).

FACTORS CONTROLLING LICHEN DISTRIBUTION

Our understanding of the factors controlling the distribution of different lichen species in temperate regions is still somewhat intuitive. More information is available from harsher habitats such as deserts and polar regions (Seaward, 1977) or based on a limited range of experimentally useful plants (Kershaw, 1984). Barkman's *Phytosociology and Ecology of Cryptogamic Epiphytes* (1958) remains the most comprehensive discussion of conditions experienced by epiphytic plants.

Because lichens lack a protective cuticle they lose water readily but

SPECIES (1)	MORPHOLOGY (2)	SUBSTRATUM (3)	HABITAT (4)			
			L	H	U	M
Cetraria chlorophylla (Willd.) Vainio (5)	Fo	E		*		
Diploicia canescens (Dickson) Massal. (5)	P	ES	*		*	*
Evernia prunastri (L.) Ach. (5)	Fr	E	*	*		.
Hypogymnia physodes (L.) Ach. (5)	Fo	ES	*	*	*	
Hypogymnia tubulosa (Schaerer) Havaas	Fo	E	*	*		
Lecanora atra (Huds.) Ach.	C	S	*	.	*	*
Lecanora campestris (Schaerer) Hue	C	S	*	.	.	*
Lecanora chlarotera Nyl.	C	E	*	*		
Lecanora conizaeoides Nyl. ex Crombie (5)	C	ES	*	*	*	*
Lecanora dispersa (Pers.) Sommerf.	C	Se	*	*	*	*
Lecanora muralis (Schreber) Rabenh. (5)	P	S	*		*	
Ochrolechia parella (L.) Massal.	C	S	*	.		*
Parmelia caperata (L.) Ach. (5)	Fo	ES	*	*		
Parmelia glabratula (Lamy) Nyl.	Fo	E	*	*	*	
ssp. *fuliginosa* (Fr. ex Duby) Laundon	Fo	S	*	*	*	
Parmelia perlata (Huds.) Ach. (5)	Fo	Es	*			?
Parmelia revoluta Flörke (5)	Fo	Es	*			
Parmelia saxatilis (L.) Ach. (5)	Fo	ES	*	*	.	
Parmelia subaurifera Nyl.	Fo	E	*	*		
Parmelia subrudecta Nyl. (5)	Fo	ES	*	*		
Parmelia sulcata Taylor (5)	Fo	ES	*	*	*	*
Parmelia tiliacea (Hoffm.) Ach.	Fo	SE	*			
Parmeliopsis ambigua (Wulfen) Nyl.	Fo	E	*	*	.	
Placynthium nigrum (Huds.) Gray	C	S	*		?	
Platismatia glauca (L.) Culb. & C. Culb.	Fo	E	*	*		
Ramalina farinacea (L.) Ach. (5)	Fr	E	*	*		
Ramalina fastigiata (Pers.) Ach. (5)	Fr	E	*	.		.
Ramalina fraxinea (L.) Ach. (5)	Fr	E	*			.
Solenopsora candicans (Dickson) Steiner (5)	P	S	*	.	?	*
Stereocaulon pileatum Ach.	Fr	S	*	*	*	
Usnea florida (L.) Wigg. (5)	Fr	E	.	.		
Usnea subfloridana Stirton	Fr	E	*	*		
Xanthoria calcicola Oxn.	Fo	Se	*	.	*	
Xanthoria parietina (L.) Th. Fr. (5)	Fo	SE	*	*	*	*

(1) = Nomenclature follows Hawksworth, James and Coppins (1980).

(2) C = Crustose
Fo = Foliose
Fr = Fruticose
P = Placodioid

(3) E = Epiphytic
S = Saxicolous
e or s = occasional

(4) L = Lowland
H = Highland (above 750')
U = Urban
M = Maritime
* = regularly
. = occasional
? = uncertain

(5) = British Isles distribution mapped in Seaward and Hitch (1982).

TABLE 1. Species characteristics.

also absorb dissolved chemicals all over their exposed surfaces. Consequently their distribution is perhaps more strongly influenced by atmospheric conditions than that of higher plants. A number of geographical and biotic factors must be taken into account when interpretations are made of the local distribution patterns.

Hill ridges south of Bristol are roughly orientated north-west/south-east while to the north ridges are lower but have a more north-east/south-west orientation (Figs 2-4). This is significant in relation to the direction of the wind. South of Bristol there are many more sheltered valleys and combes protected from such extremes as winter gales laden with sea-salt or industrial and urban pollution. Higher altitudes create more

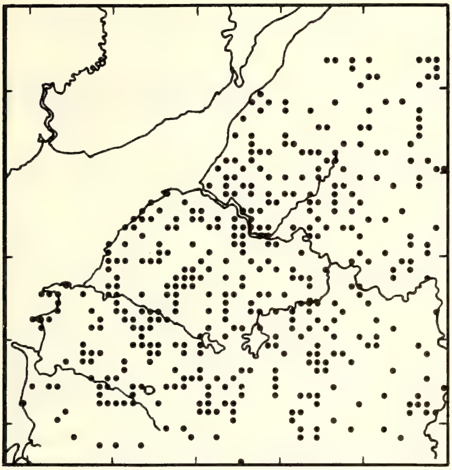

Fig. 1. Sites visited.

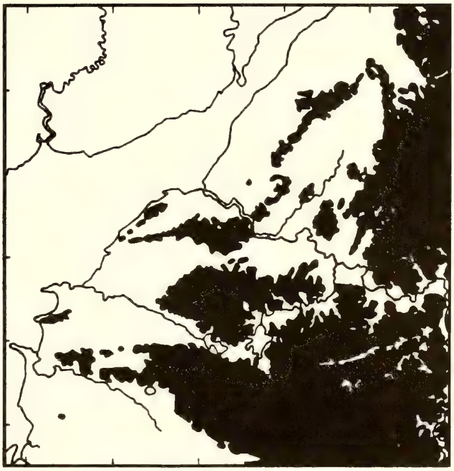

Fig. 2. Land above 250 feet.

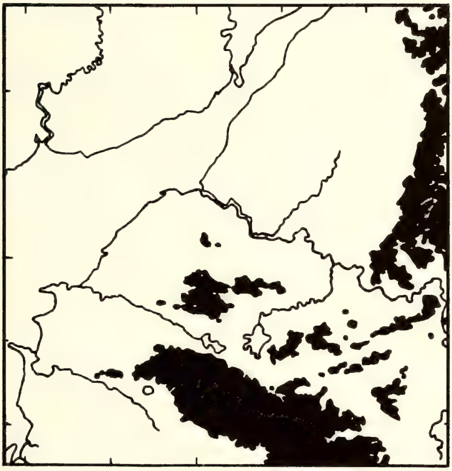

Fig. 3. Land over 500 feet.

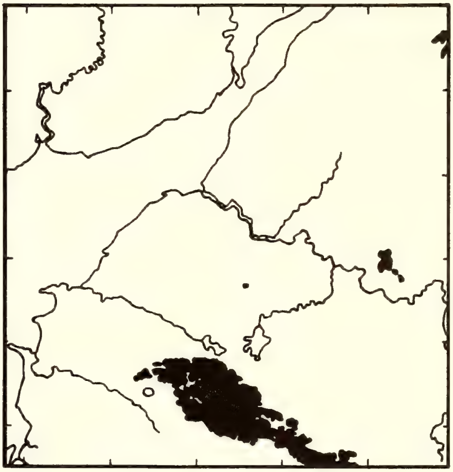

Fig. 4. Land over 750 feet.

exposed habitats and this may limit the distribution of particular species.

Man-made pollution is generally considered to be harmful to lichen growth although individual species show differing susceptibilities to sulphur dioxide (Ferry *et al.*, 1973; Hawksworth and Rose, 1976). The distribution maps presented here confirm that the existence of a large industrial and urban mass in the area studied has substantially influenced the distribution of many lichen species. Domestic fuels are still a significant source of sulphur dioxide emissions and, despite the presence of large industrial concerns at Avonmouth, north of Bristol, it is likely that the former source represents a major cause of lichen death. Smaller built up areas (Fig. 5) may also have similar effects.

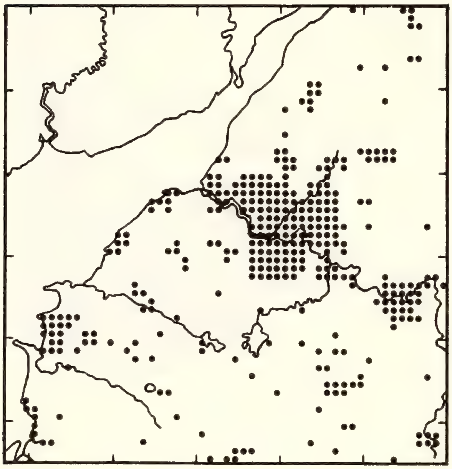

Fig. 5. Built-up areas.

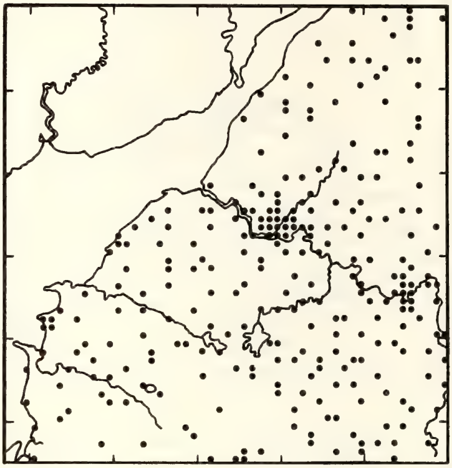

Fig. 6. Churches.

It is known that in many areas sulphur dioxide levels are declining and that lichens are returning to previously hostile environments (Seaward, 1976; Rose and Hawksworth, 1981). It should be noted that the observations reported here were made over a number of years, with most records from the early 1970's. Subsequent casual observations have confirmed the encroachment of a number of sensitive species towards the centre of Bristol. It should also be noted that the acidification of rainwater, due to gaseous emissions, has apparently benefited a number of species which prefer more acidic tree barks e.g. *Parmeliopsis ambigua* (Fig. 47) and *Platismatia glauca* (Fig. 29) (Hawksworth and Rose, 1976).

While gaseous pollutants are important determinants of distribution patterns, other man-made factors are significant. In rural areas agricultural chemicals (fertilisers or pesticides) may have some effect (Gilbert, 1977). Nutrient enrichment, particularly around farms, may favour some species (e.g. *Diploicia canescens* (Fig. 35) and *Xanthoria calcicola* (Fig. 37). The absence of suitable habitats within urban areas, such as the destruction of native trees and the substitution of exotic trees with unsuitable bark, are of some consequence. A more positive effect is due to the introduction of different rock types into an area dominated by calcareous rock exposures. Siliceous bricks and tiles of buildings (Fig. 5) and grave stones in church yards (Fig. 6) permit the growth of some non-calcareous species. Absence of some saxicolous species from thinly-populated upland areas reflects the dearth of churches in such regions.

COMMENTS ON THE MAPS FOR INDIVIDUAL SPECIES

Parmelia sulcata (Figs. 7,8,11) and *Parmelia saxatilis* (Figs. 9,10,12). These are superficially very similar grey foliose species with pseudocyphellate (cracked) upper surfaces. *P. sulcata* possesses soredia whilst the older central parts of the thallus of *P. saxatilis* are covered with isidia. In this region *P. sulcata* is substantially more widespread than *P. saxatilis*.

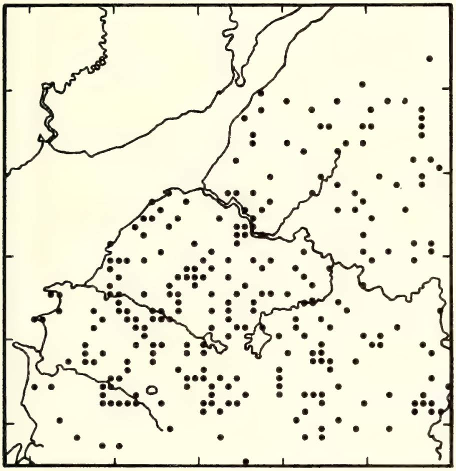

Fig. 7. *Parmelia sulcata*
(Epiphytic).

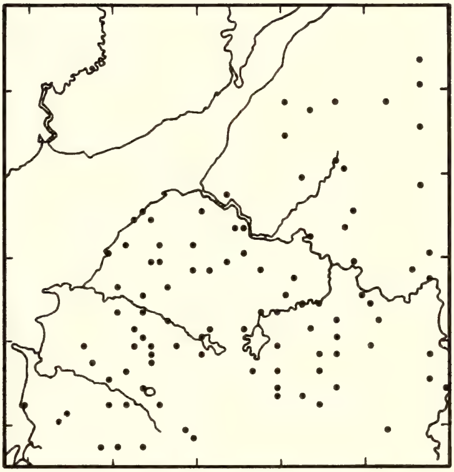

Fig. 8. *Parmelia sulcata*
(Saxicolous).

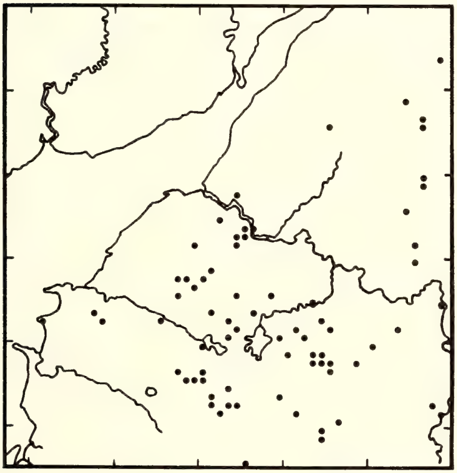

Fig. 9. *Parmelia saxatilis*
(Epiphytic).

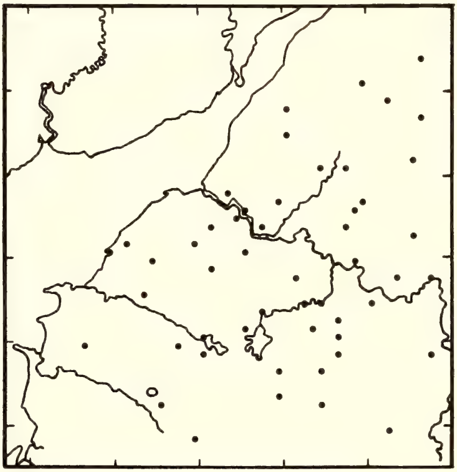

Fig. 10. *Parmelia saxatilis*
(Saxicolous).

P. saxatilis is possibly more sensitive to urban pollution when growing as an epiphyte (Fig. 9) than when saxicolous (Fig. 10) whereas the reverse may apply (Figs. 7 & 8) with *P. sulcata*. Epiphytic *P. saxatilis* is less frequent in lowland and maritime areas than epiphytic *P. sulcata*, perhaps because it requires a more leached (nutrient poor) environment.

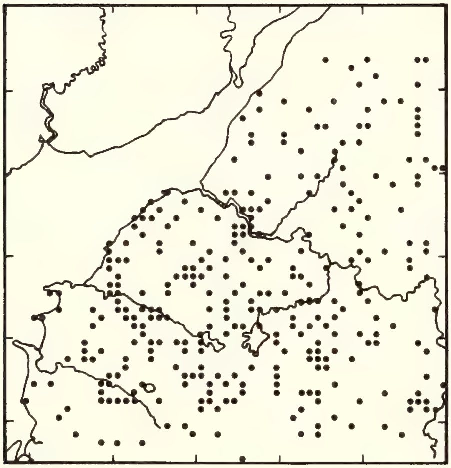

Fig. 11. *Parmelia sulcata*, all records.

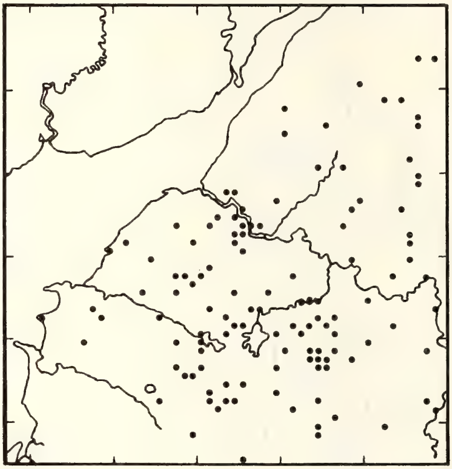

Fig. 12. *Parmelia saxatilis*, all records.

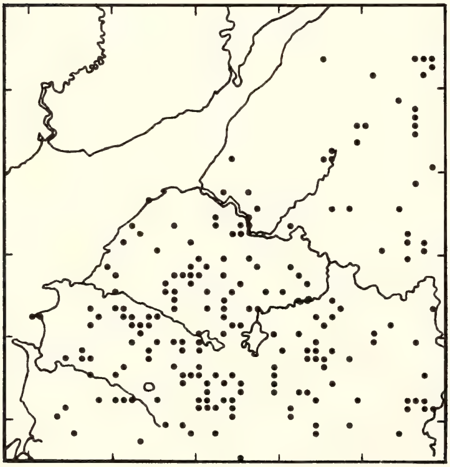

Fig. 13. *Hypogymnia physodes*.

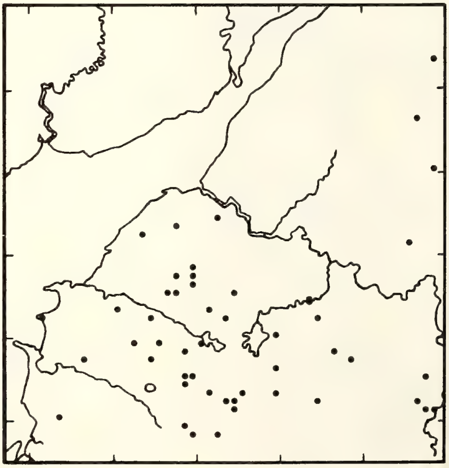

Fig. 14. *Hypogymnia tubulosa*.

Hypogymnia physodes (Fig. 13) and *Hypogymnia tubulosa* (Fig. 14). Another pair of superficially similar species but with grey, inflated, thalli usually possessing soredia on the undersurface of the reflexed apices (*H.*

physodes) or over the inflated but intact lobe ends (*H. tubulosa*). *H. physodes* is more widespread and less pollution-sensitive than *H. tubulosa*. North of Bristol, *H. physodes* has a similar distribution to that of the less widespread *P. saxatilis* suggesting that these two species may have similar sensitivities to gaseous pollutants.

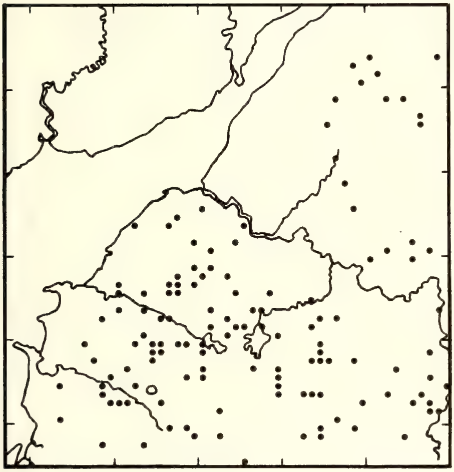

Fig. 15. *Parmelia caperata*.

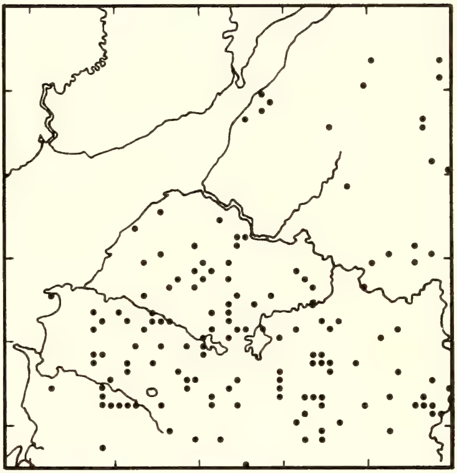

Fig. 16. *Parmelia subrudecta*.

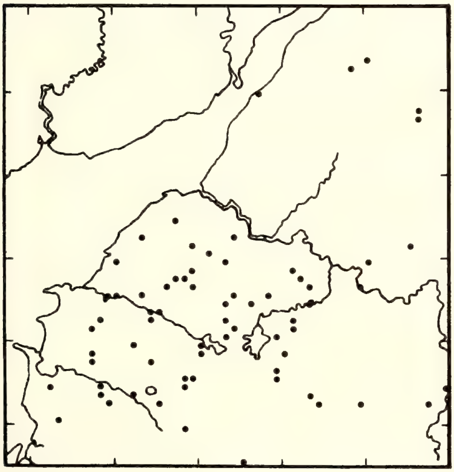

Fig. 17. *Parmelia revoluta*.

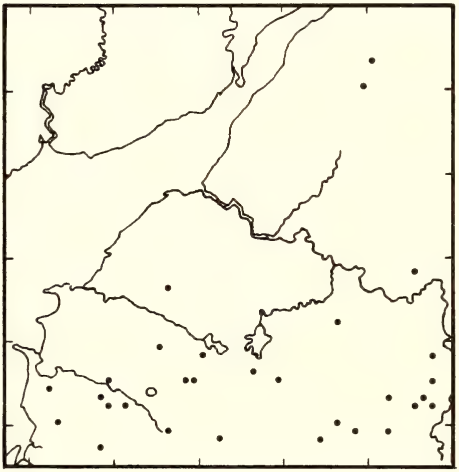

Fig. 18. *Parmelia perlata*.

Parmelia caperata (Fig. 15) and *Parmelia subrudecta* (Fig. 16). These species have very similar distribution patterns in the Bristol region. Their absence from the area immediately north of the river Avon around Bristol and Avonmouth indicates that they are more pollution-sensitive than *P. saxatilis* and *H. physodes*. Although the yellow-green sorediate *P. caperata* is usually thought to be more pollution-sensitive (Hawksworth and Rose, 1970) than the grey *P. subrudecta* (possessing soredia in circular soralia), there is no clear distinction in this region. This is possibly due to lack of discrimination between saxicolous and epiphytic records in this survey, whereas the pollution scales previously devised refer exclusively to epiphytic material. It is intersting that *P. subrudecta*, and a number of other relatively sensitive species, are found around Aust where the small hillocks appear to act as a local screen to pollution blown from Avonmouth and South Wales.

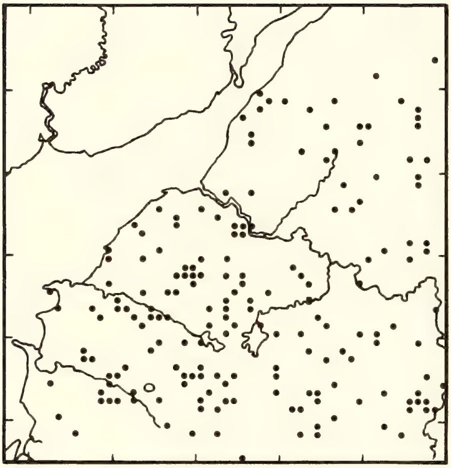

Fig. 19. *Parmelia glabratula*.

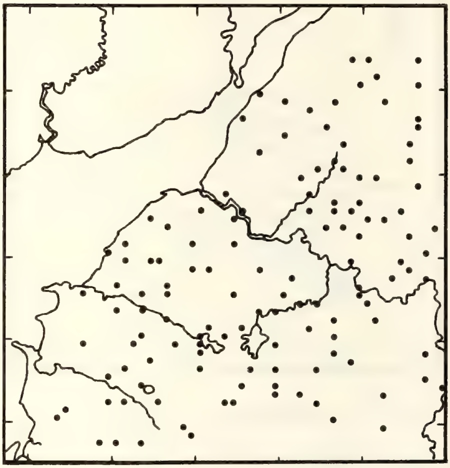

Fig. 20. *Parmelia glabratula* ssp. *fuliginosa*.

Parmelia revoluta (Fig. 17) and *Parmelia perlata* (Fig. 18) represent further examples of progressively more pollution-sensitive foliose species. The former species is superficially similar to *P. subrudecta* in its grey adpressed thallus but possesses marginal soralia while the latter, also with marginal soralia, is much more elevated from the substratum. Pollution-sensitive species are frequently present close to the southern boundary of Bristol but are progressively displaced further from the northern limits of the city as a result of the prevailing wind and the more wooded nature of the southern parts of Bristol.

Parmelia glabratula (Fig. 19) and *Parmelia subaurifera* (Fig. 21) are both chocolate-brown species usually found growing closely adpressed to the bark surface, with the sorediate *P. subaurifera* more frequently found at the tips of branches compared to the isidiate *P. glabratula*. Despite fewer records, *P. subaurifera* is obviously more pollution-sensitive than is *P. glabratula*. The darker brown saxicolous *P. glabratula* ssp. *fuliginosa* (Fig. 20) shows a very similar pollution sensitivity to *P. glabratula* although the two inhabit very different substrata.

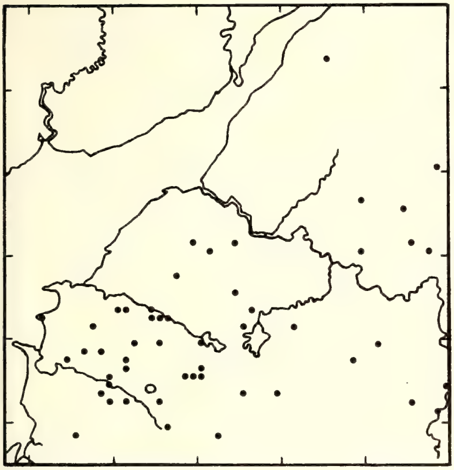

Fig. 21. *Parmelia subaurifera.*

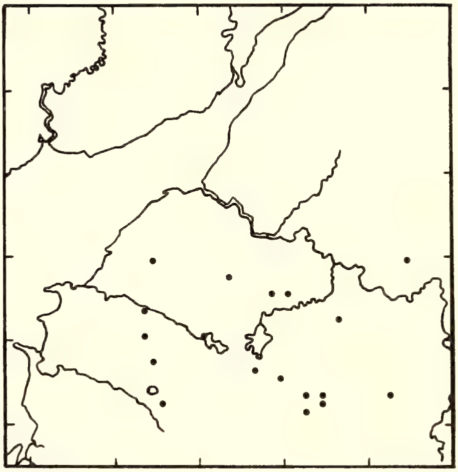

Fig. 22. *Parmelia tiliacea.*

The remaining *Parmelia* species, *Parmelia tiliacea* (Fig. 22), is much rarer than the previous species and field observations show no obvious pattern to its erratic occurrence. It is known to be relatively pollution-sensitive (Hawksworth and Rose, 1970) and this could partly account for its distribution in this area.

A similar sequence of apparent sensitivity to urban pollution is seen amongst the fruticose epiphytic species reported here. *Evernia prunastri* (Fig. 23) is the most abundant epiphytic fruticose lichen in the Bristol area and is apparently slightly more tolerant of urban pollution than *Ramalina farinacea* (Fig. 24). Within the genus *Ramalina* there is an obvious

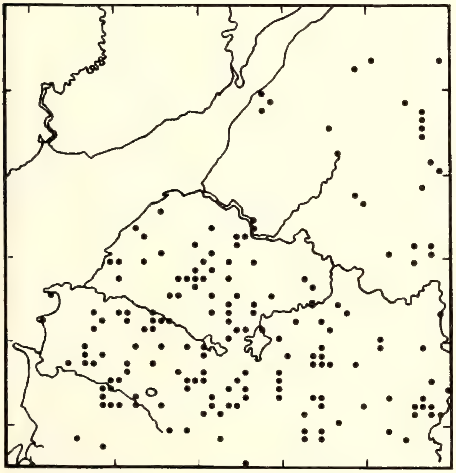

Fig. 23. *Evernia prunastri.*

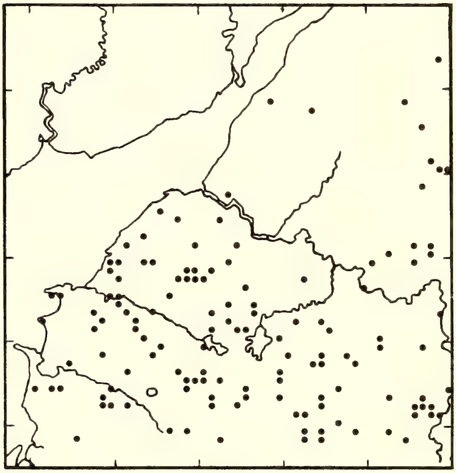

Fig. 24. *Ramalina farinacea.*

increase in pollution sensitivity of epiphytes from *R. farinacea* through *R. fastigiata* (Fig. 25) to *R. fraxinea* (Fig. 26). In the Bristol region the distribution of *R. fraxinea* may be modified by a preference for more open and windy habitats which are best satisfied on the exposed Somerset Levels and on the farmed hill ridges.

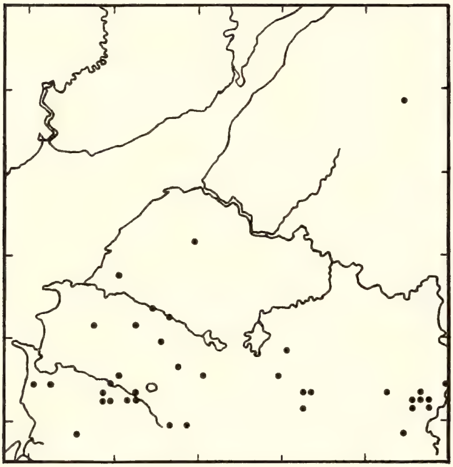

Fig. 25. *Ramalina fastigiata.*

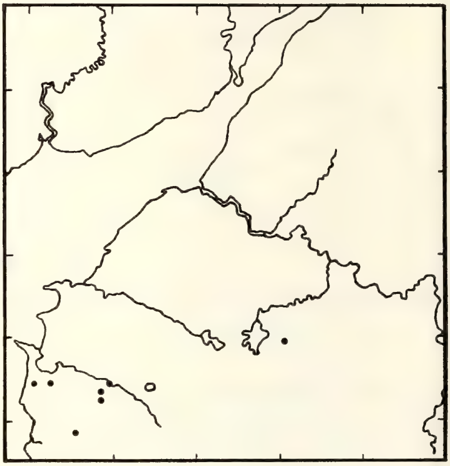

Fig. 26. *Ramalina fraxinea.*

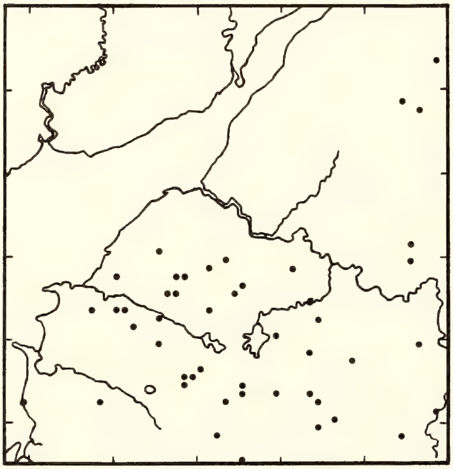

Fig. 27. *Usnea subfloridana.*

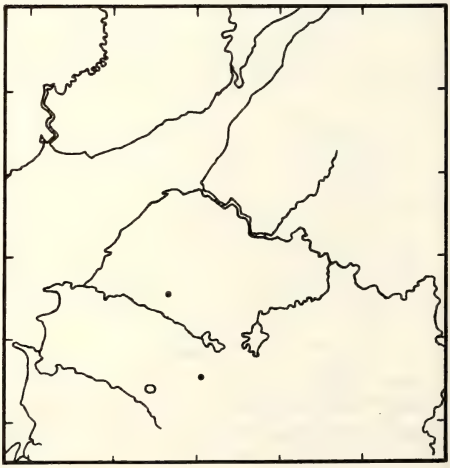

Fig. 28. *Usnea florida.*

The fruticose lichen genus *Usnea* contains some of the most pollution-sensitive epiphytic lichens. Around Bristol *Usnea subfloridana* (Fig. 27) shows a pattern intermediate between *R. farinacea* and *R. fastigiata* but may have a greater tolerance to exposed upland conditions compared to *R.*

fastigiata. *Usnea florida* (Fig. 28), a predominantly south-western species in the British Isles (Seaward and Hitch, 1982) is rare in the Bristol region and is confined to sheltered woodland sites.

Platismatia glauca (Fig. 29) and *Cetraria chlorophylla* (Fig. 30) show morphologies intermediate between the foliose and fruticose habit with the former species being generally more raised from the substratum. Both species are best represented at upland sites and are distinctly non-maritime, probably because they may prefer nutrient-poor bark which is prevalent in upland sites due to greater leaching. However, slight bark acidification, as a result of sulphur dioxide pollution and/or acid rainfall, may also enable both species, and particularly *P. glauca*, to grow in more lowland regions.

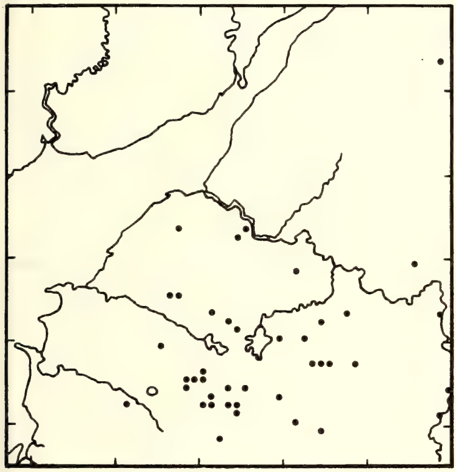

Fig. 29. *Platismatia glauca*.

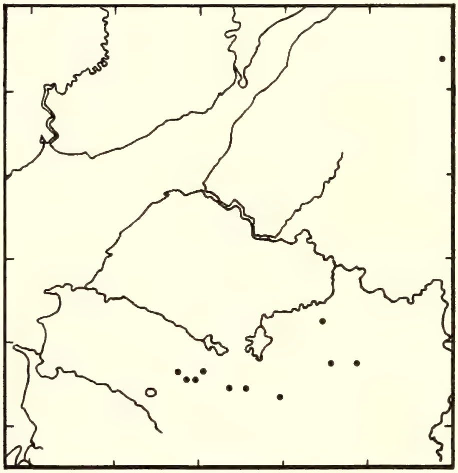

Fig. 30. *Cetraria chlorophylla*.

Diploicia canescens (Figs. 31-35 - see p. 40/1) is a placodioid species with a broad substratum range and substantial tolerance to pollution. It is more frequently found in urban areas on saxicolous substrata (Fig. 32) than as an epiphyte (Fig. 31) due to its ability to grow on siliceous (Fig. 33) as well as on calcareous (Fig. 34) substrata. In rural areas it appears to prefer calcareous substrata but, because of its preference for nutrient-rich habitats, this may be due to the coincidence of calcareous materials with nutrient-rich farms. Lack of suitable habitats may account for its absence from upland regions.

Xanthoria parietina (Fig. 36 - see p. 41) and *Xanthoria calcicola* (Fig. 37 - see p. 41) are two orange foliose lichens. *X. parietina* usually has a fertile centre to the thallus whereas *X. calcicola* lacks fruiting bodies and has a warted and rumpled appearance. Both species are primarily associated with calcareous substrata and appear to be relatively pollution-tolerant. They are particularly frequent around farms and it has been suggested that *X. calcicola*, at least, may benefit from the nutrient enrichment in such areas. *X. parietina* is the species more commonly found on coastal rocks, often forming a pronounced orange zone above the high tide mark.

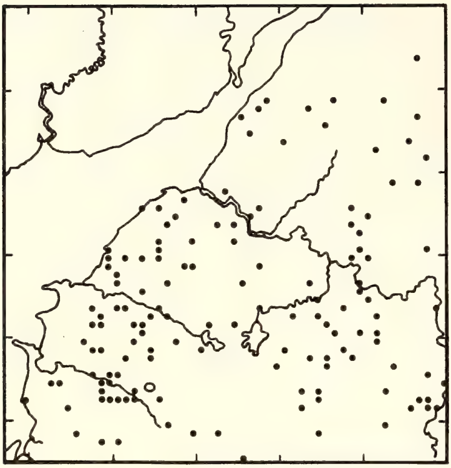

Fig. 31. *Diploicia canescens* (Epiphytic).

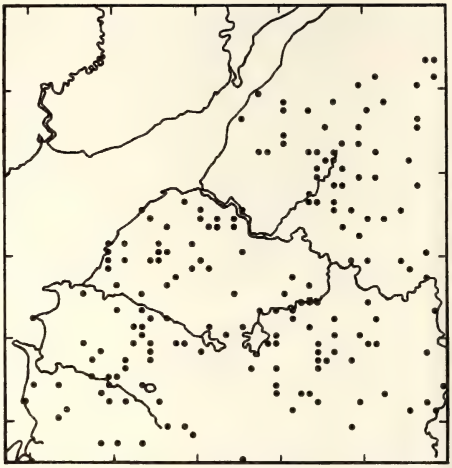

Fig. 32. *Diploicia canescens* (Saxicolous).

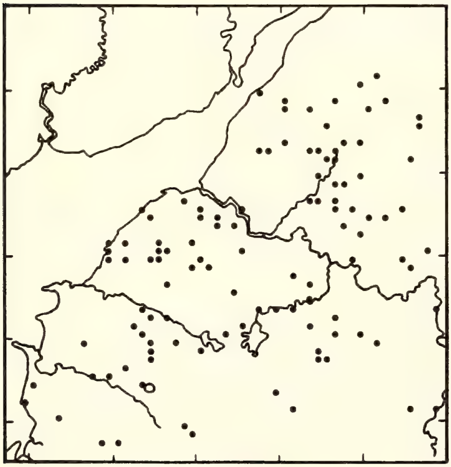

Fig. 33. *Diploicia canescens* (Saxicolous - siliceous).

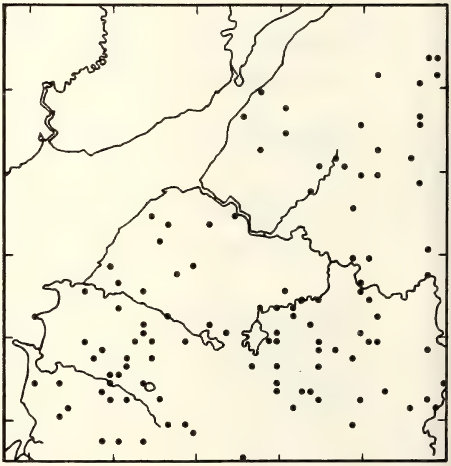

Fig. 34. *Diploicia canescens* (Saxicolous - calcareous).

Amongst the crustose species studied it is obvious that *Lecanora conizaeoides* (Fig. 38 - see p. 42) and *Lecanora dispersa* (Fig. 39 - p. 42) appear to be totally unaffected by pollution. The former species is frequently epiphytic in rural areas but in more polluted urban areas will also grow on siliceous and occasionally calcareous substrata while the latter is almost exclusively found on calcareous substrata with rare occurrences on bark rich in salts. The abundance of *L. conizaeoides* throughout the study area indicates that atmospheric pollution affects the whole region. *L.*

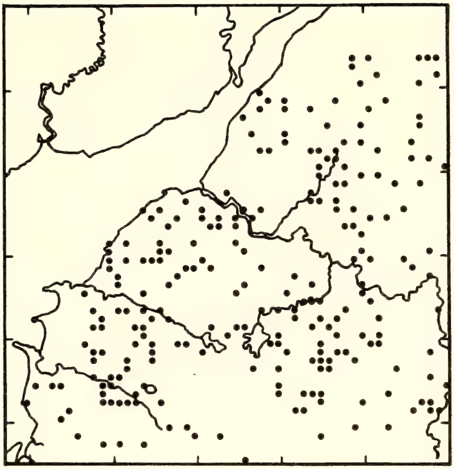

Fig. 35. *Diploicia canescens*, all records.

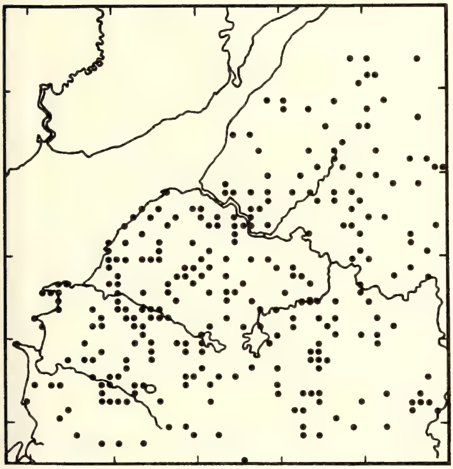

Fig. 36. *Xanthoria parietina*.

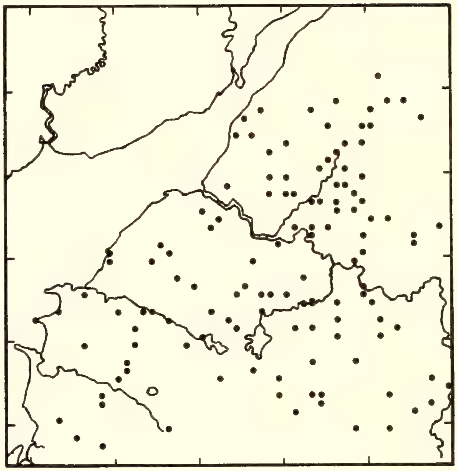

Fig. 37. *Xanthoria calcicola*.

conizaeoides has become a common epiphyte in most of the British Isles where winter mean sulphur dioxide levels exceed 50-150 µg m^{-3} Hawksworth and Rose, 1976; Seaward and Hitch, 1982). *Lecanora chlarotera* (Fig. 40 - p. 42) is a significantly more pollution-sensitive epiphytic species than is *L. conizaeoides* and, to a lesser extent, the calcareous rock-inhabiting *Lecanora campestris* (Fig. 41 - p. 42) can be similarly compared with *L. dispersa*. Scarcity of *L. campestris* in upland regions may reflect the absence of suitable calcareous substrata as it is frequently observed on dressed calcareous tombstones.

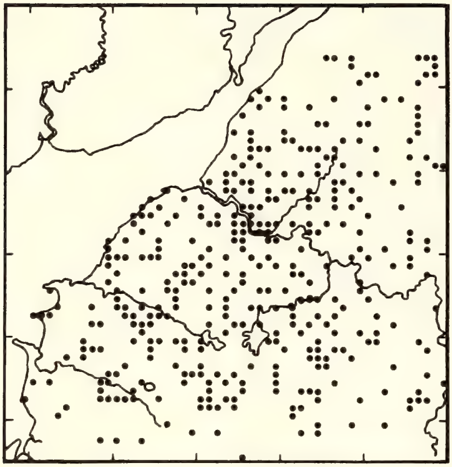

Fig. 38. *Lecanora conizaeoides.*

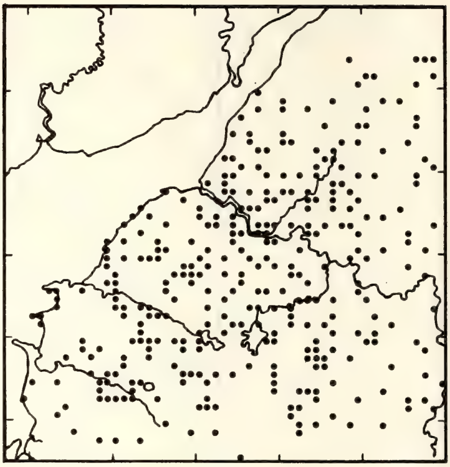

Fig. 39. *Lecanora dispersa.*

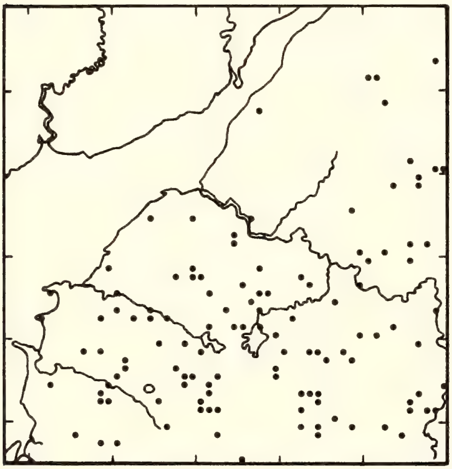

Fig. 40. *Lecanora chlarotera.*

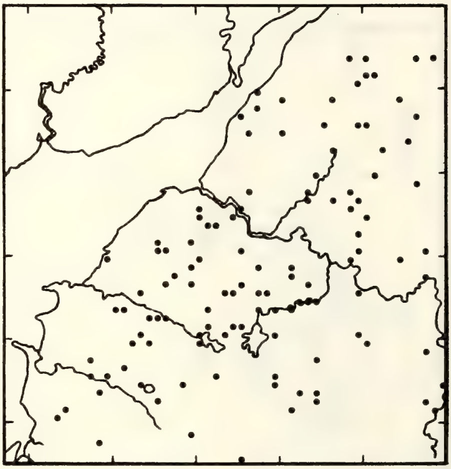

Fig. 41. *Lecanora campestris.*

Tombstones are of importance in determining the occurrence of several crustose and placodioid species. Thus *Ochrolechia parella* (Fig. 42 - p. 43) and *Lecanora atra* (Fig. 43 - p. 43) occur regularly on coastal maritime rocks but inland they are most frequently found on siliceous rocks, of which tombstones are the commonest examples. The somewhat scarcer *O. parella* also appears to be more pollution-sensitive than *L. atra*. While both *Placynthium nigrum* (Fig. 44 - p. 43) and *Solenopsora candicans* (Fig. 45 - p. 43) are often found on calcareous church memorials, especially flat-topped bench tombs, they also regularly grow on natural limestone exposures. Some degree of pollution sensitivity is shown by these species. The scattered nature of

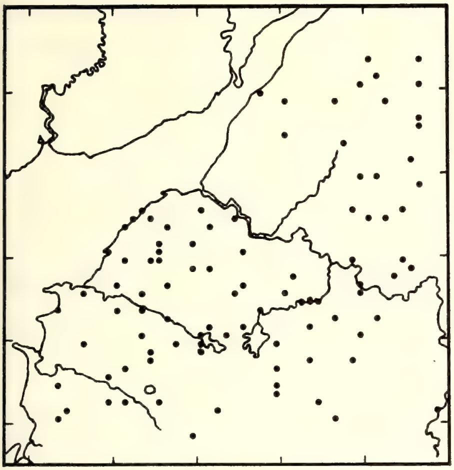

Fig. 42. *Ochrolechia parella.*

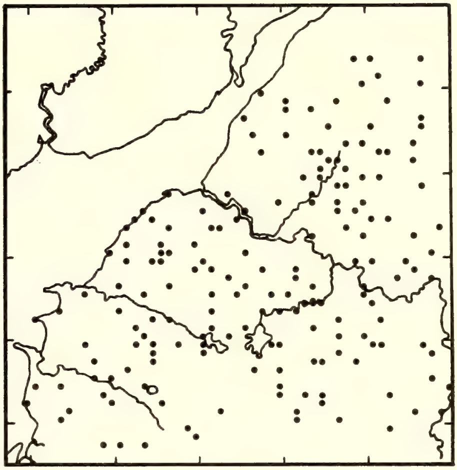

Fig. 43. *Lecanora atra.*

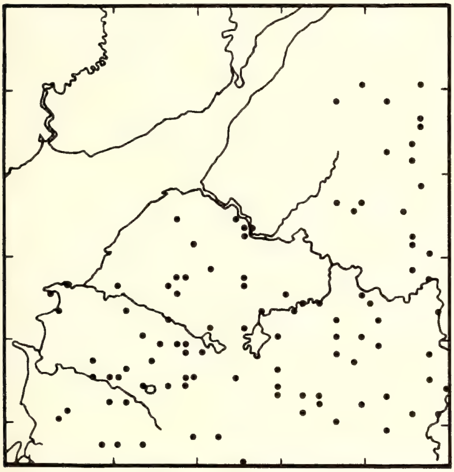

Fig. 44. *Placynthium nigrum.*

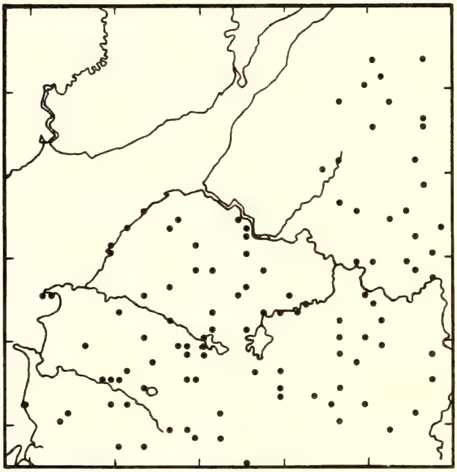

Fig. 45. *Solenopsora candicans.*

the occurrences north of Bristol make it difficult to rank *O. parella, S. candicans* and *P. nigrum* in order of sensitivity but such a sequence may be supported by further observations.

Lecanora muralis (Fig. 46 - p. 44), *Parmeliopsis ambigua* (Fig. 47 - p. 44) and *Stereocaulon pileatum* (Fig. 48 - p. 44) have distributions which may almost show these species to have preferences for urban conditions. In the British Isles *L. muralis* has a marked preference for man-made compared to to natural substrata and an ability to grow successfully in urban regions (Seaward, 1976). The same pattern appears to be true for the Bristol region,

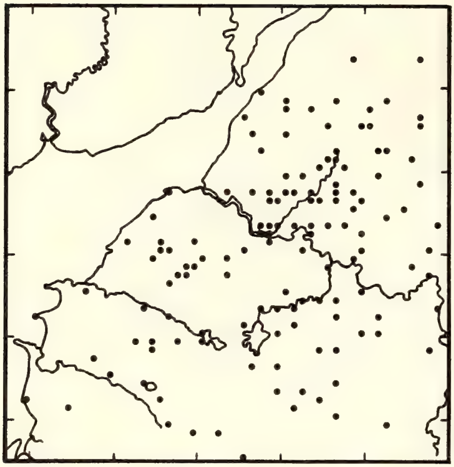

Fig. 46. *Lecanora muralis.*

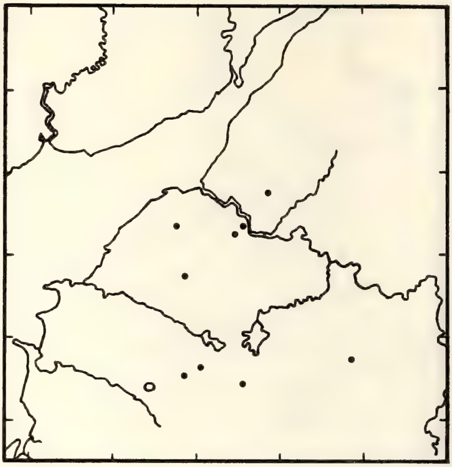

Fig. 47. *Parmeliopsis ambigua.*

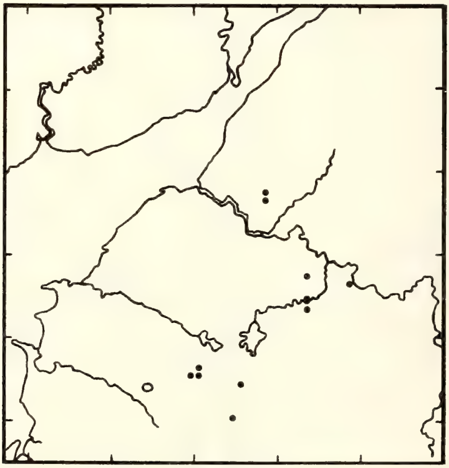

Fig. 48. *Stereocaulon pileatum.*

with a marked accumulation of reports within Bristol and rural reports frequently deriving from small towns and their churchyards. *P. ambigua* appears to be a species with a preference for acidic bark which is spreading into lowland areas due to the acidification of bark as a consequence of pollution by sulphur and nitrogen oxides (Hawksworth and Rose, 1976). It is not surprising, therefore, that in the Bristol region it is found in upland areas and, even more than with *P. glauca* and *C. chlorophylla*, closely adjacent to or within Bristol. *S. pileatum* is another species with an unusual distribution. It occurs in Bristol on soft brick walls near Southmead Hospital and on the lead slag found at the disused Mendip lead mines (Brown, 1973). Subsequently it has been found on siliceous roof tiles around Keynsham

(Fig. 48). Because of the inaccessability of roofs as a habitat for study it is not known whether it is more widespread than this in the Bristol region!

GENERAL COMMENTS

Centering distribution maps on an urban area tends to emphasise the influence of gaseous pollutants on lichen distribution. Although only a limited range of species has been studied here it is apparent that species can be ranked in terms of their sensitivity to products of the urban environment. The way in which the survey was conducted does not permit the construction of maps showing zones of similar species composition and hence winter mean sulphur dioxide levels (Hawksworth and Rose, 1970). It must be remembered that the maps only represent the occurrence of a species within a 1km grid square and give no indication of its abundance.

The dominant wind direction in the region has resulted in an impoverished flora north of the River Avon and the approach of many apparently sensitive species close to the southern boundary of Bristol. In some cases this is due to the occurrence of suitable habitats, such as Leigh Woods, where moderately dense woodland acts as a partial filter to gaseous pollution. Other local topographical features influence the occurence of lichens. The orientation of hills north of Bristol tend to channel the pollution downwind, whereas the hills south of Bristol act as further barriers to the dispersion of pollution from Bristol. Thus it is apparent that the southern slopes of both Dundry Hill and the Mendips have a richer lichen flora than do the northern slopes facing Bristol. For some species there is evidence of an inhibitory influence of the coast which may be due to either intolerance of maritime conditions or greater exposure to the pollution derived from South Wales.

Despite the fact that this survey has not obtained data from all of the 1 km grid squares in the region, it is considered to provide an outline of the distribution of lichens within the region. It is hoped that this will act as a base from which to document changes in the distribution of lichens in the Bristol region. Resurveying the same area in the future will allow the influence on individual species of changes in quantities of gaseous pollutants, agricultural chemicals, woodland management and urban spread to be assessed.

ACKNOWLEDGEMENTS

We are very grateful to the many unnamed people who permitted us access to their land or provided us with lichen records but especially to Dr F. Rose, Mrs M. Hickmott and Mr R.H. Bailey, who provided data for a number of squares.

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AVON & DISTRICT ENTOMOLOGICAL REPORT, 1983

Compiled by the Recorders of the Entomological Section

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In contrast to the previous year, there was a marked fall in the volume of records received in 1983, and there were also fewer observers submitting record cards. This was a reflection of the relatively low level of abundance of insects during the cool, wet spring and surprisingly, during the warm, dry months of July and August. The exchange of records between the Entomological Section and the Bristol Regional Environmental Records Centre (BRERC) has continued, but the policy to use the same recording card has been modified. The Section will continue to use its own species card and records from these cards will be transcribed onto the larger BRERC species card for permanent storage of records in their databank. However, the BRERC locality card listing species for a single site or locality will be used for all surveys being undertaken by the Section, and members will be encouraged to use these cards for localities they regularly visit.

The Recorders would like to take this opportunity to thank members who submitted records during 1983 which form the basis of this Report. Without their painstaking and often laborious efforts of copying from their personal recording schemes, such comprehensive annual reviews of several of the more popular orders would not be possible. The job of the Recorders would be a little less exacting if all members submitted records on the standard species record card, rather than as lists of records on other formats of card or paper which have to be extracted and copied by the Recorders onto the record cards. Also, it is helpful to identify the site or location of each record by stating the nearest town or village, and giving six figure grid references to provide precision for site records (essential for the compilation of 1 and 2km distribution maps).

Two recorders left the recording team during 1983 - A.R. Nichols, who was responsible for the *Odonata* since 1977, and L.S. Way, late of the BRERC, who assisted with the *Lepidoptera* (Butterflies). The Section is indebted to these Recorders for their invaluable contributions to the recording scheme and to the Report. S. Randolph has agreed to look after the *Odonata*, and this Report contains his first contribution which includes a summary of the current status of local dragonflies.

The area covered by the various sections of this Report, with one exception, is the county of Avon and adjacent localities of entomological interest in the bordering counties of Gloucestershire, Wiltshire and Somerset. Records from these latter counties are indicated by G, W or S respectively - all other records refer to Avon. For the *Odonata*, the recording area has been extended to include the vice-counties 6 and 34, excluding the area west of the Severn. Records refer to single specimens unless otherwise stated. A listing of many of the sites and localities cited was given in the 1982

Report, and should be consulted to locate particular sites. Grid references given refer to the centre of the site or locality.

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WEATHER SYNOPSIS (Compiled by A.H. Weeks)

The outstanding features of 1983 were the wet spring, the hot and very dry but comparatively short summer, and the sharp change to unsettled autumnal weather at the very beginning of September. February, April and May were cooler than average, but these were more than offset by warmer January, July, August and December, so that year's mean temperature was 1°C up. Only February, July, August and October offered more sunshine than expected: the other months were rather dull, especially May, June, September and November. January, April, May and September were exceptionally wet, but the number of days on which rain fell during the year was about average and the total was about 95% of normal. The last spring frosts occurred in late April, and the earliest autumn frosts in late October - about average in each case, as was the incidence of frost. Hardly any snow was seen to fall at low altitudes and none settled on low ground. The following is a summary month by month:

January was very mild and wet, with temperatures 3°C above average and rainfall $\frac{1}{3}$ above average. Sunshine was just below normal. February was colder than average (-1.8°C) and dry, with only $\frac{1}{3}$ of the average rainfall. Sunshine was about 106% of normal. March temperatures were about the seasonal normal, but it was a relatively dry month (80% of average rainfall), although rain fell on 21 days. Maximum temperatures did not rise above 15°C, and sunshine was low at about 80%. April was cool and wet. Astonishingly, the mean temperature was the same as January's, and the mean minimum was 2.1°C *lower* than January's! 60°F (15.5°C) was not reached until the 16th - the latest date for 12-13 years. It was the wettest April since 1966 (190% of average), with 21 days of rain. Sunshine was low at 90%. May continued cool and wet, with mean temperatures $\frac{1}{2}$ to 1°C below average and rainfall 175-200% of normal. Sunshine was low (about 70%) - in other words, it was far from a spring-like month. In June, temperatures returned to a little higher than normal and rainfall was about average, but sunshine was again low (80-90%). However, in July, summer arrived. It was hotter in parts even than the famous July of 1976. Overall, day temperatures were 5-7° higher and night minima 2° higher than average. The thermometer reached 90°F (32°C) on at least one day. Rainfall was confined to four days on which thunderstorms occurred (70% of the total fell on the night of the 31st), and amounted to about 40% of the long-term average. On the other hand, sunshine figures were $\frac{1}{3}$ to $\frac{1}{2}$ more than normal. This sunny trend continued into August, with hours of sun 125-135% of average. As in July, rain was well down (about $\frac{1}{4}$ of average) - the second driest August since 1921 and the fifth driest of the century. Temperatures too were high, being over 2° above average: on only three days did they fail to reach 70°F (21°C) and 80°F was reached on five days -

another good summer month, making the three summer months amongst the driest and warmest in recent times. September started unsettled, but temperatures continued to be slightly above average. There was a severe and damaging gale on 2nd-3rd. Rainfall was heavy, particularly on the 15th, which was the wettest day of the year (1.2", 30.5mm), and the monthly total was 25% to 50% above average. Sunshine was low with only 60-70%. October started wet and mild. Rain fell on every one of the first 18 days, but thereafter there was very little and the month ended with only 84% of average. Sunshine was high at 110%. November was exceptionally dry with only about 40% of average (it had the lowest rainfall for this month since 1956 and was the fifth driest in 120 years) and most of what rain fell did so in the three days 24th, 25th and 26th. It was also dull, at about 60% average sunshine, but temperatures were up by about one degree. December was another warm month (up by nearly 2°C), and was only slightly wetter than average. Sunshine was 130% of normal.

BUTTERFLIES *(Lepidoptera)* by G.W. Sorrell and A.H. Weeks

Once again, the records incorporate some provided by the Bristol Regional Environmental Records Centre at the City of Bristol Museum and Art Gallery, in addition to those from our own members. For these we are grateful, because the volume of records received from members in 1983 was rather smaller than in recent years. Some of the dearth was no doubt due to the variable and often adverse weather conditions, which put observers at a disadvantage as well as the butterflies; the ideal - to position oneself immediately in the appropriate habitat in order to see which insects are taking advantage of every burst of sunshine - is, sadly, unattainable.

The overall effects of the mild and wet winter were to reduce the numbers of some of the hibernating species flying in the spring: either they fell foul more easily to predators or were depleted by disease brought on by the wet conditions. The spring was far from ideal for breeding, with the result that the summer broods were smaller in number (especially in the case of the Small Tortoiseshell) and rather later than usual. The most noticeable effect of the poor weather in April and May was that the spring species appeared on the wing about one month later than normal in this area. Remarkably late dates for some species were recorded, e.g. the Green Hairstreak and the Grizzled Skipper, which continued well into July. Perhaps the most seriously affected of all was the Small Copper, of which there were very few records in the spring - however, there were, fortunately, signs of recovery in August.

However disappointingly the season began, there were exciting compensations. The finding of a Large Tortoiseshell (possibly two) on a site not far from the 1982 sighting suggests that there may be a small colony in Avon. High Brown Fritillaries, also now scarce, were seen at the same site. The Silver-studded Blue was recorded in three new locations, and lastly, but by no means least, the Adonis Blue was found on Mendip. In mid-June, the Clouded Yellows arrived all over southern England in unexpected numbers: why this species should have chosen 1983 in which to migrate *en masse* and *before* the real summer weather set in will probably remain a mystery. Hundreds of these butterflies were seen at sites along the English Channel coast, but such numbers do not seem to have been approached in Avon. There was a sprinkling of var. *helice* amongst those seen, and at least two Pale Clouded

Yellows. *Colias crocea* was undoubtedly the 'Butterfly of the Year'. There were unconfirmed reports of the Camberwell Beauty in August, but these were probably escapes or had assisted passages on ships. The hot summer did not produce a mass migration of this species, as occurred in 1976. A female Monarch found dead in a field at Hinton Hill, Dyrham in September is now in the City Museum's collection (Ref. No. BRSMG Ac 2159).

The very hot and dry but short summer produced an abundance of summer 'browns', but their season was short, probably because the wild flowers withered early and the supply of nectar ran out; in particular hemp agrimony on which so many butterflies like to feed, produced poor flower-heads in 1983. Possibly for the same reason, there were few Red Admirals and Painted Ladies to be seen in the countryside in comparison with those reported from gardens. Overall, it was a variable season and, on balance, a reasonably good one.

The scientific and vernacular names, also the order of species, follow those given in the check list by Higgins and Riley (1975).

Pieris brassicae L. (Large White) Common throughout the district: noted from 30 April to 23 October. Most numerous late July to mid-August.

Pieris rapae L. (Small White) Common: noted from 13 April to 23 October. Most numerous late July to early August.

Pieris napi L. (Green-veined White) Fairly widely distributed but less common than in previous years, with better numbers in spring brood than in summer. First record 30 April, last 28 September.

Anthocharis cardamine L. (Orange Tip) Widespread in fair numbers: seen 15 April until 23 July - an unusually long season. Most frequent late May to mid-June, which is rather late.

Colias crocea Geoffroy (Clouded Yellow) An unusually large migration this year. Recorded all over the district, first 17 June, last 28 October. Largest numbers: 20, Ashton Vale, Bristol, 23 July and over 50, Willsbridge, July 27. *C. crocea* var. *helice* reported from various locations.

Colias hyale L. (Pale Clouded Yellow) One, Stinchcombe Hill, near Dursley (G), 23 July and Saltford, 5 September. A pair at Shapwick Heath, S, 28 July.

Gonepteryx rhamni L. (Brimstone) Widely distributed in fairly good numbers, with peaks April, late May to mid-June and late July to mid-August. First noted 7 March; last, 30 October.

Leptidea sinapis L. (Wood White) No records for 1983.

Limenitis camilla L. (White Admiral) Several at Lower Woods, Wetmoor, late June to early July. Four, Michael Wood, 7 July: also reported from the Brockley Combe area, 28 June and sites in Cotswolds.

Inachis io L. (Peacock) Recorded from 7 March to 23 October: particularly numerous in August after poor spring appearance.

Vanessa atalanta L. (Red Admiral) Four seen April, having apparently hibernated in a Bristol church. Others seen 30 April and 1 May, but main influx did not arrive until first week of July. Numbers fair in August and September, but lower than in recent years. Last noted 3 December.

Vanessa cardui L. (Painted Lady) Noted from 6 June to 28 October, in somewhat reduced numbers than in 1982, but with a small peak in late September.

Nymphalis polychloros L. (Large Tortoiseshell) One near Flax Bourton, 13 July (netted for confirmation and released at same spot later).

Aglais urticae L. (Small Tortoiseshell) Generally a poor year. First seen 2 February, but spring numbers were low with no great improvement until mid-August, with numbers remaining fairly high until early October. Last noted 2 November.

Polygonia c-album L. (Comma) Widespread, in reasonable numbers from 15 March to 22 October, with maxima in August.

Nymphalis antiopa L. (Camberwell Beauty) Several reported near Portishead, early August. Unconfirmed sighting of a single near Clevedon, August - probably released by breeder.

Argynnis paphia L. (Silver-washed Fritillary) Noted at Inglestone Common, 7 July, and at Lower Woods, Wetmoor, late July and early August, and in small numbers in Goblin and Brockley Combes, and Gordano Valley between Easton-in-Gordano and Clevedon, also from scattered sites on Mendip.

Mesoacidalia aglaja L. (Dark Green Fritillary) A few only, Brean Down, 18 June; Clevedon, 10 July and also in July at Backwell Hill near Backwell on 20th, Dolebury Warren on 27th, Charterhouse, Mendip, S, on 15th, 27th, 28th and 1 August.

Fabriciana adippe L. (High Brown Fritillary) Still very scarce; Backwell Hill, near Backwell, 17 July and single, Dolebury Warren, 27 July.

Clossiana euphrosyne L. (Pearl-bordered Fritillary) Five, Middle Hope, 6 June and single, Burrington Common, near Burrington, 7 June.

Clossiana selene Schiff (Small Pearl-bordered Fritillary) One, Charterhouse, Mendip, S, 22 June and four, 5 July; four, Stock Hill, near Priddy, S, 27 June; Crook Peak, S, 12 June to 3 July; four, Dolebury Warren, 5 July and one, Burrington Common, near Burrington, same date.

Euphydryas aurinia Rott. (Marsh Fritillary) About 20, Lower Woods, Wetmoor 10 June; two, Charterhouse, Mendip, S, on 5 July. Larvae were found at Stinchcombe Hill, near Dursley, G, in April

Melanargia galathea L. (Marbled White) Another good year. Widespread in good numbers (after a solitary sighting, 15 May) from 25 June to 16 August. Considerable numbers seen Lower Woods, Wetmoor; Goblin Combe, near Cleeve; Dolebury Warren and Filton, mid-July; at Velvet Bottom, near Charterhouse, S, late July; also within the City at Purdown, Bristol.

Hipparchia semele L. (Grayling) Recorded 11 July to 20 August, Goblin Combe: in smaller numbers at Dolebury Warren, Burrington Ham, Uphill, Sand Point and Charterhouse and Velvet Bottom, near Charterhouse, S, late July to early August.

Maniola jurtina L. (Meadow Brown) Common over the entire district; first noted 7 June, last 5 September. Largest numbers on Cadbury Hill, near Yatton and Goblin Combe in mid-July.

Aphantopus hyperantus L. (Ringlet) Common: first recorded 4 July, last 16 August. Largest numbers recorded in Cleeve Woods, near Cleeve, and Goblin Combe area, mid-July; at Stinchcombe Hill, near Dursley, G, and Charterhouse, S, late July.

Pyronia tithonus L. (Gatekeeper) A very good year. Widespread over the area. First noted 15 June, last 17 September. Largest numbers seen at Middle Hope; Bourton Combe, near Flax Bourton; Goblin Combe and Dolebury Warren, late July to early August.

Coenonympha pamphilus L. (Small Heath) Numbers considerably down on past years. First recorded on 4 June, last on 12 September. Largest colonies at Dolebury Warren, late June; Goblin Combe; Charterhouse, S; Burrington Common, near Burrington, early July; and Walton (Clevedon), mid-August.

Pararge aegeria L. (Speckled Wood) A comparatively poor year; small spring emergence, but numbers picked up later in the season. Recorded over the whole area from 23 April to 1 October, most numerous in late June, mid-July and mid-August. On 20 August an aberration was seen in Cleeve Woods, with a single cream spot on each wing.

Lasiommata megera L. (Wall Brown) Fairly widespread, but thinly populated First seen 30 April, last 6 September. Largest numbers seen at Shapwick Heath, S, late July, and Avonmouth, Walton (Clevedon), Middle Hope and Goblin Combe, late August.

Hamaeris lucina L. (Duke of Burgundy Fritillary) No records received in 1983.

Thecla betulae L. (Brown Hairstreak) Single female seen near Clevedon, 29 August and 18 September; male at Inglestone Common, near Wickwar, 3 September.

Quercusia quercus L. (Purple Hairstreak) Reported from a number of widely separated sites from 16 July to 30 August. Most numerous at Shirehampton, Bristol and Willsbridge, late July; Lower Woods, Wetmoor, 8 July to end August: Dolebury Warren and Butleigh, S, August.

Callophrys rubi L. (Green Hairstreak) Widely but rather thinly distributed in South Avon, particularly on the Mendips. Recorded 24 May to 13 July; four, Goblin Combe, 6 June; five, Charterhouse, S, 12 June; numerous, Stock Hill, near Priddy, S, same date and Crook Peak, S, 12, 19 June; three, same place, 13 July.

Strymonidia w-album Knoch (White Letter Hairstreak) Single male, Goblin Combe, 28 July.

Lycaena phlaeas L. (Small Copper) A very poor year, with very few sightings in the spring. First seen 18 April, then 22 and 27 May. The summer brood was more in evidence, but still in small numbers. Largest sighting, six in Velvet Bottom, near Charterhouse, S, 6 August. Last recorded 19 October.

Aricia agestis Schiff. (Brown Argus) Widespread, but fairly thinly distributed over the area. First seen 4 June, last 6 September. Highest numbers near Avonmouth; Ashton Court, near Bristol; Dolebury Warren; Walton (Clevedon); Goblin Combe and Cleeve Woods, near Congresbury; and Charterhouse, S, in mid-August.

Cupido minimus Fuessly (Small Blue) Seen at four sites on Mendip, 15 June to 19 August, and single male near Clevedon, 20 June. Numerous at Dolebury Warren, mid-June.

Celastrina argiolus L. (Holly Blue) Widespread over the area in comparatively small numbers. Scarce in spring, but good summer brood. First seen 29 April, last 29 August. Largest numbers, over ten in Blaise Castle Woods, Bristol, and East Wood, Portishead, late July and August; also King's Weston Hill, Bristol; Lower Woods, Wetmoor, and Cadbury Hill, near Yatton in mid-August.

Plebejus argus L. (Silver-studded Blue) Noted at two sites in south Avon, 3 July and 11 August, also at a site near Frome, S, in August.

Lysandra coridon Poda (Chalkhill Blue) Noted at seven sites, three in north Avon (maximum number 32, Bannerdown, 3 August), three sites on Mendip and Brean Down, S. First recorded 30 July, last 22 August.

Lysandra bellargus Rott. (Adonis Blue) Recorded at two sites on southern Mendips; good numbers at one of these, 13 August; five in Gordano Valley, 29 August, and ten near Burnham-on-Sea, S, 29 August.

Polyommatus icarus Rott. (Common Blue) Widespread in the area. First seen Alveston, 7 June and last, Saltford, 12 September. Fair numbers in late June, July-August. Largest numbers, over fifty, Dolebury Warren, 22 June; fifty, Portbury Dock, 27 July; over thirty, Shirehampton, Bristol, 30 July; thirty, Churchill, 14 August and thirty-five, Goblin Combe, 17 June, 14 August.

Pyrgus malvae L. (Grizzled Skipper) Few records from North Avon, but first seen Inglestone Common, near Wickwar, 15 May. Fairly well distributed over rocky sites in South Avon; highest counts in Velvet Bottom, S, 4 June; Goblin Combe, 9 June and 3 July; Dolebury Warren, 18 and 22 June; Crook Peak, S, 4 June, 3 July; Bourton Combe, near Flax bourton, 13 July. Last seen, Velvet Bottom, S, 15 July.

Erynnis tages L. (Dingy Skipper) Distribution similar to Grizzled Skipper, with only record from North Avon being Lower Woods, Wetmoor, 10 June. First seen 26 May, last 13 July, with largest numbers Goblin Combe, 9 June; Dolebury Warren, 15-18 June; Priddy Mineries, S, 20 June and Burrington Combe, 22 June.

Thymelicus sylvestris Poda (Small Skipper) Greatly reduced numbers compared with previous years, but still widespread over the entire area. First seen Brandon Hill, Bristol, 1 July; last near Filton, 19 August. Largest numbers at Butleigh, S, and Velvet Bottom, S, 15 July; Dolebury Warren, 26, 27 July; Goblin Combe, 28 July; Burrington Combe and Common, 30 July, 18 August.

Thymelicus lineola Ochs. (Essex Skipper) No records received.

Ochlodes venata Turati (Large Skipper) Numbers reduced. First seen Brandon Hill, Bristol, 3 June; last, Cheddar Valley Railway, near Winscombe, 30 August. Largest numbers, Goblin Combe, 27 June, 11, 20 July, and Charterhouse, S, 27 July.

Danaus plexippus L. (Monarch) Female found, Hinton Hill, near Dyrham, 18 September - a rare migrant.

MOTHS *(Lepidoptera)* by K.H. Poole

Although the summer of 1983 was finer than of late, this did not result in much improvement as far as moths were concerned. Several observers reported large numbers at light on a few nights, but without anything unusual appearing, and some normally abundant species were markedly few in number. The influx of Clouded Yellow butterflies was not paralleled by migrant moths, apart from a number of Vestal and Humming Bird Hawk, with a few Convolvulus Hawk, one Bordered Straw, the Rush Veneer, and of course the Silver Y.

Names are in accordance with Kloet and Hincks *A Check List of British Insects*, Vol. XI, Pt. 2, 2nd Ed., 1972.

Agrius convolvuli L. (Convolvulus Hawk) Locking, Weston-super-Mare, 13 September, 2 October (EAFD); Weston-super-Mare, 23 September, 6 October (KHP) and Congresbury, 26 September (GWS).

Macroglossum stellatarum L. (Humming Bird Hawk) Saltford, 3 August, 7 September (WD); Berrow, S, 15 August (RSC); Weston-super-Mare, 21 August, 17 September (RA) and Henleaze, Bristol, 17 September (JFB).

Stauropus fagi L. (Lobster Moth) Larva, Goblin Combe, 18 August (GWS).

Bena prasinana L. (Green Silver Lines) Hinton Charterhouse, 15 July (PJC).

Earias clorana L. (Cream Bordered Green Pea) Westhay, S, 26 July (EAFD).

Atolmis rubricollis L. (Red-necked Footman) Stock Hill Plantation, near Priddy, 8 July (EAFD).

Acronicta leporina L. (Miller Moth) Congresbury, 9 July (GWS).

Craniophora ligustri D. & S. (Coronet) Congresbury, 28 September (GWS).

Lampra fimbriata Schreb. (Broad Bordered Yellow Underwing) Congresbury, 9 August (RWR).

Luperina testacea D. & S. (Flounced Rustic) Congresbury, 11 August (GWS).

Hada nana Hufn. (The Shears) Congresbury, 29 September, (GWS).

Apamea ophiogramma Esp. (Double Lobed) Street Heath, near Street, S, 20 July (EAFD).

Ipimorpha retusa L. (Double Kidney) Westhay, S, 19 August (EAFD).

Eremobia ochroleuca D. & S. (Dusky Sallow) Dyrham Park, Dyrham, 5 and 7 August (PJC).

Hoplodrina ambigua D. & S. (Vine's Rustic) Berrow, S, 18 and 21 August (CHSB).

Achanara geminipunctata Haw. (Twin-spotted Wainscot) Congresbury, 11 August (GWS).

A. dissoluta Treit. (Brown-veined Wainscot) Congresbury, 3 August (RWR).

Lithophane leautieri Boisd. (Blair's Pinion) Weston-super-Mare, 3 October (CHSB).

Heliothis peltigera D. & S. (ordered Straw). Congresbury, 17 July (GWS).

Hypena rostralis L. (Buttoned Snout) Portbury, 29 September (JFB).

Rhodometra sacraria L. (Vestal) Avon Gorge, Bristol, 1 August (WD); Congresbury, 25-27 September, and 29-30 same month (GWS); Weston-super-Mare, 25, 27, 28 September (CHSB).

Zeuzera pyrina L. (Leopard Moth) Yatton, 19 July (DC).

Aphomia sociella L. (Bee Moth) Henleaze, Bristol, 23 June, 3, 25 July and 3 August (JFB).

Nomophila noctuella D. & S. (Rush Veneer) Middle Hope, 11 June (KHP) and Congresbury, 23-25 September (GWS).

DAMSELFLIES AND DRAGONFLIES *(Odonata)* By S. Randolph

In this report I have made a slight departure from the format of previous years by taking the opportunity of briefly summarising the status and distribution of *Odonata* in vice-counties 6 and 34 (excluding that part of vice-county 34 across the Severn). This is the area covered by the recording scheme of the Bristol Regional Environmental Records Centre which extends the north and south boundaries of the normal recording area for the Avon & District Entomological Report. Records mainly from the last three years, including some earlier ones from the 1970's, but not confirmed this decade, have been plotted on BRERC distribution maps using the 1km square as the recording unit. It is intended to include a selection of these in subsequent reports.

The vernacular and scientific names used, and order of species, follow the check list given by Keen (1977).

Zygoptera (Damselflies)

Platycnemis pennipes (White-legged Damselfly) Appears to be almost entirely confined to the R. Avon and the Kennet & Avon Canal where it is very common. A single exception was a record from the R. Brue, nr Baltonsborough, S, 30 June (JMB).

Pyrrhosoma nymphula Sulzer (Large Red Damselfly) A total of 40 records show this species to be well-established on the Somerset Levels, also on the levels around Congresbury and Puxton and in several pools on Mendip. Few, on rhyne, Churchill, 26 June (RSC).

Ischnura elegans Van der Linden (Blue-tailed Damselfly) Probably the commonest damselfly, with 80 known breeding sites scattered across the whole of the recording area.

Enallagma cyathigerum Charpentier (Common Blue Damselfly) About 25 breeding sites known, mainly on Mendip and southwards. Reported from 16 sites in 1983.

Coenagrion puella L. (Azure Damselfly) The second commonest damselfly. 65 recorded sites with a distinct westerly distribution.

C. pulchellum Van der Linden (Variable Damselfly) Only 14 breeding sites known, centring on the levels between Clevedon and Yatton, and also around the Cheddar area. Two males, Cheddar Moor, nr Cheddar, S, 10 June (JMB) and few, nr Axbridge, S, 26 June (RSC).

Erythromma najas Hansemann (Red-eyed Damselfly) This species does not appear to have been recorded in the area before 1982, when it was discovered in several widely scattered sites. In 1983, many were found on the Kennet & Avon Canal (JH), and also reported from a pond nr Priddy, S, (JMB).

Lestes sponsa Hansemann (Emerald Damselfly) Only about a dozen breeding sites have been found so far, mainly at Blagdon Lake, Chew Valley Lake, and ponds on Mendip. Very common, pond at East Harptree, July (JMB, JH).

Calopteryx splendens Harris (Banded Demoiselle) Much more widely spread than the next species, *C. virgo* Common along the R. Cam, R. Chew and parts of the R. Avon. In July, large numbers were found confined to one small stretch of the R. Frome below the weir at Stapleton, Bristol (SR). Scattered records occurred over a wide area of the North Somerset levels.

C. virgo L. (Beautiful Demoiselle) A very limited distribution. Largely restricted to the R. Avon and its tributaries where it is often common. It was found along much of the length of the R. Cam in July (SR).

Anisoptera (Dragonflies)

Brachytron pratense Müller (Hairy Dragonfly) The Avon and North Somerset levels represent an important stronghold, *nationally*, for this species. 26 sites have been recorded, including several discovered in 1983. 10, drainage ditch along disused railway line, Congresbury, 12 June (SR) and up to 12, Weston Moor, nr Walton-in-Gordano, June (JH). Several on rhynes, nr Axbridge S, (JMB, RSC) and a few, including an ovipositing female, at pool in dunes, Berrow, S, (RSC).

Aeschna cyanea Müller (Southern Hawker) This is the most widely distributed *Aeschna*, breeding in rhynes and pools throughout the area, but clearly preferring the North Somerset levels and pools on Mendip. About 60 emerged from a small garden pond in Bath (JH).

A. grandis Müller (Brown Hawker) Only 19 widely scattered records have been plotted from varied habitats ranging from quite fast-flowing rivers to various rhynes and pools. Noted R. Frome, nr Winterbourne, 18 August (SR); males, R. Avon at Keynsham, July (JH) and at old gravel pit, Witham Friary, nr Frome, S, 26 August (JMB).

A. juncea L. (Common Hawker) Certainly not common in the area, but where it does breed it is often abundant. Over 100 exuviae were collected from one pond on Blackdown, Mendip, S, in 1983. New records - several, at two sites, Berrow, S, 17 August and few, Weston Moor, nr Walton-in-Gordano, 25 August (RSC).

A. mixta Latreille (Scarce Hawker) Not very scarce at all. 32 widely scattered records with main concentrations in three breeding areas - the R. Avon with the Kennet & Avon Canal, Blagdon Lake and Chew Valley Lake, and the Catcott Heath area of the North Somerset levels. Many breeding on Weston Moor, nr Walton-in-Gordano, August (JH).

Anax imperator Leach (Emperor Dragonfly) Probably breeding in about 16 widely scattered sites. Over 30 emerged from pond, Ashton Court, nr Bristol, June-august (JH); single male, and one female, ovipositing, pond, Sneyd Park, Bristol, 3 July (RHP); three males, and single female ovipositing, Weston Moor, nr Walton-in-Gordano, July (JH); few, Berrow, S, 27 August (RSC) and female ovipositing, Hunstrete Lake, nr Chelwood, 30 August (JH).

Cordulia aenia L. (Downy Emerald) The rarest dragonfly in the area - only breeds in two ponds on Mendip, at one of which 12 exuviae were found in 1983 (JMB).

Orthetrum cancellatum L. (Black-tailed Skimmer) Limited to one small area of the North Somerset levels, although in July it was reported for the first time from the AWT reserve, Weston Moor, nr Walton-in-Gordano (JH).

Libellula depressa L. (Broad-bodied Chaser) A large population exists on the North Somerset levels in the Catcott Heath area which accounts for half the total number of 22 sites. Several adults and many nymphs in shallow pool accidently formed in clay by activity of mechanical digger, Hartcliffe, Bristol, 21 June (SR).

L. quadrimaculata L. (Four-spotted Chaser) More widespread on the North Somerset levels than *L. depressa* (22 sites against 11). It occurs in large numbers at Priddy Mineries. 3, drainage ditch, nr Congresbury, 12 June (SR). Recorded for the first time at Kenn Moor, nr Kenn - several males and females, roadside ditches, 3 July (JFB).

Sympetrum sanguineum Müller (Ruddy Darter) 27 sites recorded, 16 from the

North Somerset levels. Abundant, Chew Valley Lake, 17 August (SR), and many males, Ashton Court, Bristol, in July (JH).

S. scoticum Donovan (Black Darter) This is the rarest *Sympetrum* in the area with 6 known breeding sites on Mendip and the North Somerset levels. One new site discovered in 1983 - Weston Moor, nr Walton-in-Gordano (RSC).

S. striolatum Charpentier (Common Darter) This *Sympetrum* does live up to its name for it is abundant and widespread. Approximately 60 recent records with 27 of these occurring in 1983.

TRUE BUGS *(Hemiptera)* by R.S. Cropper

Despite the fine but comparatively short summer, numbers of *Heteroptera* seemed rather small, and it is likely that the exceptionally wet spring had some bearing on this. Of particular note was the discovery of *Cyphostethus tristriatus* at East Harptree, probably associated with Lawson Cypress, and a second recent record of *Calocoris alpestris* found near Bath.

Acanthosoma haemorrhoidale L. (Hawthorn Shieldbug) On Small-leaved Lime, *Tilia cordata*, Stoke Woods, nr Rodney Stoke, S, 13 October (RMP).

Cyphostethus tristriatus Fab. On leaves of Flowering Nutmeg, *Leycesteria formosa*, in garden, East Harptree, 14 October (RMP). The host of this species is Juniper, *Juniperus communis*, which does not occur in the district, but in recent years the bug has been recorded on the introduced *Chamaecyparis lawsoniana* (Lawson Cypress). This evergreen coniferous tree was in fact growing close to the Flowering Nutmeg from which the specimen was taken.

Eysarcoris fabricii Kirkaldy Two swept from nettles, Fortnight Farm, nr Combe Hay, Bath, 16 June.

Dolycoris baccarum L. East Harptree, 23 September (RMP).

Zicrona caerulea L. In garden, Burnham-on-Sea, S, 15 August.

Metatropis rufescens Herrich-Schäffer East Harptree, 23 September (RMP).

Dicyphus stachydis Reuter Two on nettles, The Gully, Durdham Downs, Bristol, 27 April, and several on nettles, Rowberrow, S, 29 May.

D. globulifer Fallen Several on Red Campion, *Silene dioica*, Rowberrow, 29 May.

Polymerus nigritus Fallen. Two on goose grass *(Galium aparine)*, Street Heath, nr Street, S, 10 July.

Calocoris alpestris Meyer-Dur. Four on nettles beneath trees, Fortnight Farm, Combe Hay, nr Bath, 16 June - a further locality for this local species (see this Report, 1982).

Ranatra linearis L. In moorland pool, Black Down, Mendip, S, 10 April and two in pool, Lord's Wood, nr Chelwood, 2 October.

Notonecta obliqua Fallen Two in pool, Lord's Wood, nr Chelwood, 2 October.

Corixa panzeri Fieb. In pool, Lord's Wood, nr Chelwood, 2 October.

Hesperocorixa castanea Thompson Few in pool, Lord's Wood, nr Chelwood, 2 October.

Sigara semistriata Fieb. In peat cutting, Westhay Heath, nr Westhay, S, 2 October.

SAWFLIES, BEES, WASPS, ANTS ETC. *(Hymenoptera)* by R.M. Payne

Symphyta (Sawflies)

Very little work has been done on this sub-Order in the Bristol area, so I have thought it worthwhile to record all my captures.

Dolerus aeneus Hartig Rodney Stoke, S.

D. asper Zaddach Shapwick Heath, S.

D. ferrugatus Lepeletier Shapwick Heath, S.

Athalia cordata Lepeletier Rodney Stoke, S.

Aglaostigma fulvipes Scop. Rodney Stoke, S.

Tenthredopsis coquebertii Klug Middle Hope, nr Weston-super-Mare.

T. litterata Geoff. Middle Hope, nr Weston-super-Mare.

Rhogogaster viridis L. Middle Hope, nr Weston-super-Mare.

Tenthredo celtica Benson Compton Dando.

T. marginella F. Chew Valley Lake.

Aculeata (Bees, Wasps and Ants)

Lasius fuliginosus Latr. Shirehampton Park, Shirehampton, Bristol.

Vespula rufa L. Congresbury (GWS, det, RHP).

Ectemnius continuus F. Lord's Wood, nr Chelwood, and East Harptree.

Andrena flavipes Panzer Middle Hope, nr Weston-super-Mare.

TRUE FLIES *(Diptera)* by R.H. Poulding

The apparent scarcity of many of the larger diptera in 1983, particularly amongst the *Brachycera* and *Aschiza* until mid-summer, was a disappointing contrast to the previous year, when many expected species were more common than usual. There were, of course, exceptions - one being the large empid *Pachymeria tessellata*, a spring species, which was unusually common in many localities. At Middle Hope in June this empid was swarming in large numbers around the hawthorns, some resting on the blossoms and others - mainly males - forming spectacular swarms. Other species of the same genus were also more in evidence in 1983. Unusually low numbers of hover flies, *Syrphidae*, were recorded until late August in several different habitats where population levels of many species at normally peak periods were much reduced, often 10-20% of average. The following selection of species is again only representative of the large number of species recorded, and the inclusion of a particular species has, in many cases, been decided on the grounds of lack of previous records. Relative scarcity in many dipteran species is often a measure of under-recording, rather than a true reflection of their status.

Scientific names and order of species are in accordance with Kloet and Hincks *A Check List of British Insects*, Vol. XI, Pt. 5, 2nd., 1976.

Stratiomyidae (Soldier Flies)

Beris clavipes L. Middle Hope, nr Weston-super-Mare, June 11 (Ent. Sect. Survey).

Stratiomys potamida Meigen One near pool, dunes, Berrow, S, 25 June (RSC).

Tabanidae (Horse Flies)

Chrysops relictus Meigen Chew Valley Lake, 1 August (RMP).

Haematopota bigoti Gobert Female found alive in spider's web, Middle Hope, nr Weston-super-Mare, 13 August (Ent. Sect. Survey per GWS). This is the second locality for this scarce coastal species (See this Report, 1981).

Bombyliinae (Bee Flies)

Bombylius major L. (Common Bee Fly) Few records for this attractive early spring bee fly - noted in small numbers, Henleaze, Bristol: Sea Mills, Bristol; Leigh Woods NNR, Bristol and Cheddar Wood, nr Axbridge.

Dolichopodidae

Dolichopus latelimbatus Macquart. Chew Valley Lake, September and October (RPM). Three previous records for the district cited in Audcent (1948).

Campsicnemus scambus Fallen Two sites, Chew Valley Lake, September and October (RPM).

Platypezidae

Microsania pectinipennis Meigen In bonfire smoke, East Harptree, 31 August (RMP). *Microsannia* ssp. are minute flies, 1-2mm in length, which are attracted to smoke from bonfires of garden refuse and other material. Audcent (1949) gives two records for *M. pectinipennis* at Filton and Clevedon.

Syrphidae

Xanthogramma pedissequum Harris Single specimen, garden, Henleaze, Bristol, 6, 13 August (JFB).

Cheilosia albipila Meigen Shapwick Heath, S, 14 April (RMP) - an uncommon early spring syrphid with only two previously published records, both at Shapwick (Audcent, 1949).

Volucella zonaria Poda. In garden, Henleaze, Bristol, 7 July, 30 August (DAP, RHP); on *Buddleja*, quarry, Henleaze, Bristol, 30 July, and male, garden, BBC, Clifton, Bristol, 4 August (JFB).

Sericomyia lappona L. Two, Shapwick Heath, S, 17 June (RHP) - a further record for this local species.

S. silentis Harris An unusual record of one on Golden Rod *(Solidago* sp.*)* in garden, Henleaze, Bristol, 29 August (RHP). This species is local in Avon and has not previously been recorded in Bristol.

Xylota coeruleiventris Zetterstedt Stock Hill, nr Priddy, 20 July (RMP). Previously confused with *X. florum*, *X. coeruleiventris*, apparently associated associated with conifer plantations, is spreading south into southern England, and this record for Mendip is the first for Avon and District area.

Criorhina floccosa Meigen Compton Dando, 27 May (RMP) - an uncommon early spring species. Audcent (1949) gives ten records, all for late May or June.

Helophilus hybridus Loew. Female, early June, Congresbury (GWS) and single, Chew Valley Lake, 14 September (RMP).

Sciomyzidae

The larvae of this family feed on snails either as parasites in terrestrial snails or as predators of aquatic species. The following records are of sciomyzids identified by RMP in 1983 for which there are few, or no, previous records for the district.

Pherbellia dorsata Zetterstedt Chew Valley Lake, 14 September.

P. grisescens Meigen Chew Valley Lake, 14 September.

Coremacera tristis Harris Burledge Common, nr Bishop Sutton, 1 August.

Knutsonia lineata Fallen Blagdon Lake, 19 September.

Tachinidae

Tachina grossa L. On hogweed *(Heracleum sphondylium)*, East Harptree, 18 July (RMP).

Macquartia tenebricosa Meigen Chew Valley Lake, 10 October (RMP). The larvae of *Macquartia* ssp. are parasites on the larvae of beetles, notably *Chrysomelinae* with the host of *M. tenebricosa* chiefly *Chrysolina fastuosa*.

BEETLES *(Coleoptera)* by R.W. Rowe

1983 will go into the record books as a rather unspectacular year for Coleoptera recorded in Avon and district. Although the number of reporters was much about the same as in previous years, the actual total of sightings was less, with none at all coming from the area immediately to the north and north-east of Bristol.

Two of the beetles for which a special look-out was made, *Clytus arietis*, the Wasp Beetle and *Staphylinus olens*, were seen but sparingly. although both are relatively common.

The rather interesting and attractive longhorn, *Anaglyptus mysticus*, was seen in two different areas. According to Lyneborg (1977), it is locally distributed in southern England. Adults are found particularly in June, mainly in woodland and often on flowers such as hawthorn blossom.

The nomenclature followed is that given in Kloet and Hincks *A Check List of British Insects*, Vol. XI, Pt. 3, 2nd Ed., 1977.

Clytus arietis L. In garden, Berrow, S, 8 June (RSC) and four, mostly on bramble foliage, Shapwick Heath, S, 17 June (RHP).

Eurynebria complanata L. Under driftwood, dunes, Berrow, S, 25 June (RSC).

Agonum nigrum Dej. Beneath driftwood, Berrow, S, 12 March (RSC).

Ceuthorrhyncus timidus Weise On hemlock water dropwort *(Oenanthe crocata)*, dunes, Berrow, S, 30 May (RSC). This is not recorded by Wilson in his *Coleoptera of Somerset*.

Staphylinus olens Muller Under stone, Middle Hope, 10 September (RWR).

Rhantus grapii Gyll. In rhyne, Shapwick Heath, S, 30 April (RSC).

Anaglyptus mysticus L. On path at edge of reserve, Shapwick Heath, S, 17 June (RHP) and on umbels along lane, Upton Cheyney, 21 June (RWR).

Hydrophilus piceus L. One in rhyne, Tadham Moor, S, 21 May (RSC) and at Mudgley, S, on same date; two in rhyne with egg cocoons (RSC) and two in peat cuttings, Westhay Heath, nr Westhay, S, 2 October (RSC).

Catops nigricans Spence One at Herriotts Pool, Chew Valley Lake, 21 December (RMP).

Dermestes lardarius Found in house, Henleaze, Bristol, 27 May (RHP).

Coccinellidae (Ladybirds) by K.W. Miller

Records of six species from six observers included the following:

Anatis ocellata L. (Eyed Ladybird) A local species occurring on fir: Blagdon Lake, 26 March (RMP).

Coccidula scutellata Hbst. Another local species, usually in marshy places: dunes, Berrow, S, 30 May (RSC) and Chew Valley Lake, 13 December (RMP).

Coccinella undecimpunctata L. Three, Middle Hope, 9 April (RWR).

Exochomus quadripustulatus L. Three on tree trunk, Loxton Hill, nr Loxton, 2 May (RSC).

CRICKETS AND GRASSHOPPERS *(Orthoptera)* by K.W. Miller

Records were received for seven species. There were no great surprises, most of the species being relatively common, but the records are nevertheless of value. May I appeal for more records for this group? Of the records received, the following are of particular interest:

Conocephalus dorsalis Latr. (Short-winged Conehead) This small bush-cricket is usually found in moist localities. Several nymphs in meadow, Churchill, 26 June. Plentiful along rhynes, Edington Heath, nr Edington, S, 31 July (RSC).

Tettigonia viridissima L. (Great Green Bush-cricket) One singing near church, Shipham, S, 13 August (RSC).

Tetrix undulata Sow. (Common Ground Hopper) Many nymphs in woodland clearing, Westhay Moor, nr Westhay, S, 7 August (RSC).

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BRISTOL BOTANY IN 1983

by A.J. Willis

(Department of Botany, University of Sheffield)

In a year which, overall, was an average one for weather in spite of some striking conditions in several months, the trawl of plant records was substantial, with several notable finds which enrich the local flora. Apart from February, April and May, all months were of above average temperature, giving a year in which the temperature averaged 0.6^{O}C above the 50-year mean (for 1930-79) of 10.0^{O}C. In contrast, however, sunshine hours for 1983 were only 101% of the average and rainfall for the year, totalling 878.2 mm, was almost exactly average (100%) at Long Ashton Research Station to which all meteorological records relate.

January, although a wet month with 119 mm of rainfall, was nearly 3^{O}C warmer than usual, the mean minimum temperature being 4.3^{O}C. This situation is no doubt reflected in the early flowering reported at the very beginning of the year. Noted as flowering in January were *Daphne laureola* in Rodney Stoke Wood, *Helleborus foetidus* at Churchill Batch and *Potentilla sterilis* and *Hornungia petraea* at Charterhouse (R.S.C.). February was by far the coldest month of the year (with a mean temperature of 2.4^{O}C) but was much drier than usual. Early flowering *Helleborus viridis* was noted that month as suffering frost damage at Nettlebridge (R.S.C.). The more average month of March brought improved weather and *Gagea lutea* was flowering at a locality in the south of our area between mid and late March; despite being reported as a 'shy flowerer', *G. lutea* has produced flowers at this time each year at least since 1974 at this site, the best years being 1977 and 1982 (R.S.C.).

April and May, being both cold and very wet (May was the wettest month of the year, with 149.7 mm of rain), led to a late spring but subsequently, with hotter weather than usual until the end of the year, vegetation fairly rapidly caught up, with more or less normal flowering times. These weather conditions may have contributed to the abundant flowering of orchids in the last week of June: at least 1836 flowering spikes of *Anacamptis pyramidalis* were counted at Hursley Hill, and 1772 of *Ophrys apifera* at Aust (P.J. Chadwick).

Despite the favourable weather of the summer however, and high rainfall of April and May, which might have been expected to lead to good germination of alien species, 1983 was another very poor year at Avonmouth Docks. The continuing and repeated use of herbicides appears to be the main factor involved. Apart from *Setaria faberi*, the only noteworthy finds at the Docks were of *Ammi majus* L., *Ambrosia artemisiifolia* L., *Abutilon theophrasti* Medic. and *Panicum dichotomiflorum* Michx. (A.L.G. & T.G.E.). The favourable conditions of the autumn, with substantial rainfall in September and October after the dry summer months, may have promoted the late flowering of *Potentilla tabernaemontani*, which was noted (P.J.M.N.) still in flower at Callow Rocks, Shipham at the end of October. White *(Flora of Bristol,* 1912, p. 263) records that a few flowers of this plant are often produced in late autumn.

Three species of flowering plants, nationally uncommon and formerly regarded as probably extinct in North Somerset, have been found this year in numbers which suggest that their persistence is not at present in peril, especially as the habitats concerned are those in which they are typically native. *Eryngium campestre* has indeed been known for some fifteen years in its present site and it may well be that *Herniaria glabra* has had a long existence at Weston-super-Mare. Nearly a century, however, has elapsed since the previous record of the third species, *Trifolium suffocatum*, White referring to this in 1912 as 'Very rare and possibly extinct'. Many other records, e.g. of *Ophrys sphegodes* near Dursley, *Thalictrum flavum* in the Max Valley, Winscombe and of *Trifolium striatum* near Keynsham (R.S.C.), indicate the continued existence of species in particular localities. *Silene gallica*, not reported in the area for a considerable number of years apart from a rare casual appearance, is now recorded for S. Gloucestershire, and the hybrid grass *Festuca rubra* x *Vulpia myuros* is new to v.c. 34. Of alien grasses, mention may be made of *Bromus arvensis*, now nationally rare, from Sea Mills, and of *Setaria faberi* from Avonmouth Docks, the latter Bristle-grass being a first record for the Bristol area. Two interesting new county records of mosses for Somerset have been added by Mrs J. Appleyard: *Grimmia trichophylla* var. *subsquarrosa* from near Oakhill and *Bryum creberrimum* from Asham Wood, near Frome, a wooded area well known for its species-richness.

Careful study of populations of *Sorbus* in the Bristol area has elucidated their occurrence more fully (P.J.M.N.). Observations on fruit and leaves at the time of leaf-fall have shown that *S. rupicola* does not appear to be a member of the Bristol flora, and that *S. porrigentiformis* is not as widespread on Mendip as formerly presumed (see later entries for details).

The persistence of the Crucifer *Pachyphragma macrophyllum* at Failand, where it was first recorded in 1964, was reported last year in these notes. A full illustrated description of the plant, of which only one other naturalized population is known in Britain, is given by J.H. Davie and J.R. Akeroyd in the *Botanical Journal of the Linnean Society* (1983), 87, 77-82, under the title '*Pachyphragma macrophyllum* (Hoffm.) Busch (Cruciferae), a Caucasian species naturalized in Co. Avon, England'. Studies of chromosome number indicate a close relationship of *Pachyphragma* with *Thlaspi*, but the former is distinctive in its rhizomatous habit.

Information concerning the possible previous occurrence of *Carex depauperata* in Leigh Woods is fully set out in an article by C.M. Lovatt in these *Proceedings* last year (Vol. 42, 33-37) entitled 'The history and status of *Carex depauperata* Curtis ex With., the Starved Wood-sedge, in the Avon Gorge, Bristol'. The record is based on a single immature specimen gathered by H.S. Thompson (probably May 1888) and confirmed in 1980 by R.W. David as *C. depauperata*. Unfortunately the large distinctive fruits are lacking and there is some uncertainty about the date and exact locality of the specimen; however, Leigh Woods certainly appear to be a suitable habitat for the plant.

In May 1983 the Botanical Society of the British Isles held its Annual General Meeting in Bristol. On this occasion a series of talks was given (introduced by A.J.W.) on the theme 'Conservation and the Local Flora'. Dr C.M. Lovatt described some of his studies of the flora of the Avon Gorge, the late Dr M.C. Smith gave an account of conservation measures being undertaken in the Botanic Garden of the University of Bristol and C. Johnson described the role of the Avon Wildlife Trust in rare plant conservation. Excursions were run to the University Botanic Garden, the

Avon Gorge, and Charterhouse and Sand Point. The meeting is reported in *Watsonia*, 1984, Vol. 15, 59-62, where details of the field visits are given by A.L. Grenfell.

A Flora of Avon project was inaugurated on 1 December 1983 based on the Bristol City Museum. The planned study of the flora of v.c. 6 and v.c. 34 is an ambitious one, as it is based on a one square kilometre grid. Records are now being assembled at Bristol Regional Environmental Records Centre, Natural History Section, at the City of Bristol Museum and Art Gallery.

The death in 1983 of Dr A.F. Devonshire, under tragic circumstances, is a great loss to the Society; an Obituary appears in these *Proceedings* (p. 10). Not only did Dr Devonshire serve as President of the Society, but he was also a well-known figure in its Botanical Section, again serving as its President. His plant records are reported in a considerable number of the 'Bristol Botany' articles over a substantial period of years.

Names of contributors associated with several records, or with the determination of specimens, are abbreviated thus:

J.A.	Mrs J. Appleyard	A.L.G.	A.L. Grenfell
R.S.C.	R.S. Cropper	C.K.	Mrs C. Kitchen
T.G.E.	T.G. Evans	M.A.R.K.	M.A.R. Kitchen
R.F.	Lady Rosemary FitzGerald	P.J.M.N.	P.J.M. Nethercott
I.F.G.	Miss I.F. Gravestock	R.M.P.	R.M. Payne
G:	Gloucestershire	S:	Somerset

For details of the area covered by this Report, see 'Bristol Botany in 1978', p. 35.

Adiantum capillus-veneris L. Still just surviving in the remaining small part of the railway station, in what is now a builder's yard, at Wrington, S, R.F., where recorded more than thirty years ago (see 'Bristol Botany in 1952', p. 312).

Cystopteris fragilis (L.) Bernh. Old iron-works, Wadbury Valley, Mells, S, and on rock faces near underground caverns, Blackdown, S, R.S.C.

Dryopteris pseudomas (Wollaston) Holub & Pouzar (*D. borreri* auct.) Ashton Court Woods, Bristol, S, I.F.G.

D. carthusiana (Vill.) H.P. Fuchs (*D. lanceolatocristata* (Hoffm.) Alston) A few plants, boggy area, Beacon Hill, S, R.S.C. Also in pond nearby, *Spirodela polyrhiza* (L.) Schleid. (*Lemna polyrhiza* L.).

Oreopteris limbosperma (All.) Holub (*Thelypteris oreopteris* (Ehrh.) Slosson) A small colony in plantation, Rowberrow Warren, S, R.M.P. This fern is extremely local on Mendip; there are, however, at least three small colonies in Stock Hill Plantation, Priddy.

Helleborus foetidus L. Several fine plants, persistent in woodland overlooking old iron-works, Wadbury Valley, Mells, S, R.S.C. Also *Ranunculus penicillatus* (Dumort.) Bab. and *Ruscus aculeatus* L.

Aquilegia vulgaris L. Pink-flowered plant, entrance to Foxes Hole, Burrington Combe, S; persistent in Asham Wood, S, R.S.C.

Nuphar lutea (L.) Sm. Catcott Heath, S, and Hunstrete Lake, S, R.S.C.

Silene gallica L. About 30 plants on fairly newly colonizing roadside bank near Shirehampton Park, G, R.F. Associated with the colony of this uncommon species of the Bristol area were *Arabis hirsuta* (L.) Scop. and *Teucrium scorodonia* L. Also persistent as a garden weed, 1979-82, Winterbourne Down, G, A.L.G., where possibly introduced with horticultural sand. Several plants on tipped soil, Bromley Heath, Downend, G, A.L.G.; also much *Fumaria officinalis* L. ssp. *wirtgenii* (Koch) Arcangeli.

Stellaria neglecta Weihe Churchill, S, R.S.C.

Herniaria glabra L. In sandy maritime grassland, near sea front, Weston-super-Mare, S, A.J. Byfield, C.K., M.A.R.K., and R.S.C. Although recorded by W. Sole in 1791 from the coast at Weston-super-Mare, this report is not mentioned by White *(Flora of Bristol)* and has often been regarded as an error (but see R.G.B. Roe *The Flora of Somerset*, 1981, p.66). It was reported as a casual in this area in 1946 and seen in this site by N.Y. Sandwith in 1947 (unpublished record). The history of the plant at Weston-super-Mare, its persistence and associates suggest that it may be native here.

Chenopodium polyspermum L. Westhay Heath, S, R.S.C.

Atriplex laciniata L. One flowering plant at Uphill, S, R.S.C., near site where last seen in 1976.

Tilia cordata Mill. Wick Rocks, G, P.J.M.N.

Geranium columbinum L. Wick Rocks, G, P.J.M.N. Also old railway line, near Shute Shelve, S, I.F.G. and Mrs M.A. Silcocks.

G. pusillum L. A small patch in field adjoining railway, Keynsham, S, R.S.C.

Trifolium scabrum L. Plentiful in turf, Ellenborough Park, Weston-super-Mare, S, R.S.C.

T. subterraneum L. Abundant, with *T. micranthum* Viv. and *T. striatum* L., in a pasture with limestone outcrops above Channel View Farm, Cleeve, S, R.F. Previously recorded (1928) from Cadbury Hill, Yatton.

T. suffocatum L. An elongated form, in grass near sea front, Weston-super-Mare, S, R.F., conf. A.L.G. and Dr D.E. Coombe (Herb. A.J. Byfield, Dept. of Botany, University of Bristol). Although formerly known from Weston-super-Mare, this 'dense-flowered trefoil' is reported by J.W. White (*Flora of Bristol*, 1912, p. 236) as possibly extinct, although White writes '.... I confidently expect it to be rediscovered some day on the shores of N. Somerset'. It is exciting that this prediction has now come true!

Vicia bithynica (L.) L. Seven plants on roadside verge near Earthcott Green, G, A.L.G. This site is some 3 miles from the only other S. Glos. station for this species (see 'Bristol Botany in 1981') and may represent only a casual introduction rather than an extension of its range. The presence nearby of several plants of *Bunias orientalis* L. adds weight to this view, A.L.G.

Potentilla tabernaemontani Aschers. A flourishing patch in turf near the road, Rhodyate Hill, near Congresbury, S, R.F., where recorded in 1949. In hedge banks in close proximity is well established *Arum italicum* Mill. ssp. *italicum* var. *pictum* looking wild among nettles.

Sorbus porrigentiformis E.F. Warb. Two shrubs of this species observed by P.J.M.N. were recorded from Wick Rocks, G, in 1958 ('Bristol Botany in 1958', p. 425). In 1983 about a dozen specimens were seen by P.J.M.N. who notes one of tree growth, but with two boles from the base; one bole was 11 cm in diam. at 1 m from the base, the largest seen by P.J.M.N. in the Bristol area.

S. porrigentiformis appears to be the only Whitebeam in the Gorge at Wick, *S. aria* (L.) Crantz s.s. not being seen. However, the latter may perhaps formerly have been present, and have been lost from the site as a result of industrial activity and extensive quarrying.

S. rupicola (Syme) Hedl. Reported in the past from Callow Rocks, Shipham, S, but examination by P.J.M.N. of fruit and leaves showed all specimens seen to be *S. aria* (L.) Crantz s.s. H.S. Thompson reported *S. rupicola* from Callow Rocks in 1917, but this naming was not accepted by E.S. Marshall and C.E. Salmon.

In 'Bristol Botany in 1952', in referring to the then newly described *S. porrigentiformis* E.F. Warb., the Sandwiths presumed that *Sorbi* previously collected from Mendip sites should be transferred to *S. porrigentiformis*. However, P.J.M.N. regards this as a mistaken view as, of the places there named, only Cheddar Gorge and Burrington Combe have *S. porrigentiformis* (and apparently not Compton Hill). Furthermore, *S. rupicola* s.s. has never been seen by P.J.M.N. nearer to Bristol than the Chepstow area.

S. torminalis (L.) Crantz One tree, Wick Rocks, G, P.J.M.N.

Hippuris vulgaris L. Several spikes in pool, Blackdown, S, R.S.C. Also flowering tufts of *Nardus stricta* L. on damp south slopes, Blackdown, S, R.S.C.

Viscum album L. On hawthorn, old railway line, Congresbury, S, I.F.G. Also nearby, *Euphorbia lathyrus* L., *Scutellaria galericulata* L. and *Hydrocharis morsus-ranae* L.

Hedera hibernica (Kirchner) Bean The Gully, Avon Gorge, Bristol, G, I.F.G., conf. C.M. Lovatt.

Eryngium campestre L. This nationally rare native umbellifer of dry grassy places, known only from a few scattered localities in southern England, mostly near the sea, is probably an introduction in some localities. Although recorded (*The Flora of Somerset*, R.G.B. Roe, 1981) as probably extinct in Somerset, it has persisted at a site known to R. Hurst near Bath, S, for some fifteen years, conf. and comm. R.G.B. Roe, and is still present. This re-currence in vice-county 6 (it was formerly known at Worlebury Hill, Weston-super-Mare, but was apparently lost from that site at the turn of the century) is of considerable interest.

Conium maculatum L. This poisonous plant is dominant over about seven acres of the drained dam above the disbanded ochre works in the valley of the R. Boyd, Wick Rocks, G, P.J.M.N.

Sison amomum L. Biddisham, S, P.J.M.N.

Carum carvi L. Single plants, building site, St. Philip's, Bristol, G, A.L.G. and roundabout, Bath Bridge, Bristol, S, R.F., conf. A.L.G.

Primula veris L. x *P. vulgaris* Huds. Several fine plants on hedgebank near Churchill, S, R.S.C. Both parents in close proximity.

Symphytum tuberosum L. Long established on bank, once a bombed site, Clifton Down, Bristol, G, R.F.

Cuscuta epithymum (L.) L. South Stoke, S, C.K., M.A.R.K. and R.M.P.

Orobanche minor Sm. Three flower spikes on *Trifolium pratense* L., Shute Shelve Hill, S, and frequent on *Trifolium repens* L. on old railway line at Sandford, S, R.S.C. Also one plant at Keynsham.

Utricularia vulgaris L. Along short stretch of rhine, Edington Heath, S, R.S.C. Also near this site were *Sium latifolium* L. and *Galeopsis tetrahit* L.

Thymus pulegioides L. Wick Rocks, G, P.J.M.N. Also old quarry, Edford, S, P.J.M.N.

Salvia horminoides Pourr. Ellenborough Park, Weston-super-Mare, S, R.S.C., A.J. Byfield, C.K. and M.A.R.K.; also Fortnight, S, R.S.C.

Sambucus ebulus L. A good patch at edge of churchyard, Puxton, S, R.F. and Mrs M.A. Silcocks. In 'Bristol Botany in 1956' this perennial herb was recorded by Miss E. Rawlins 'in a hedge near Puxton Church'.

Dipsacus pilosus L. Persistent in Ham Woods, Croscombe, S, I.F.G., as also is *Polygonum bistorta* L.

Bidens tripartita L. Field between the Kennet & Avon Canal and the R. Avon at Claverton Pump, S, P.J.M.N.

Baldellia ranunculoides (L.) Parl. Several fine plants in flower and fruit, Edington Heath, S, R.S.C. Also very fine on Walton and Weston Moors, Gordano Valley, S.

Butomus umbellatus L. A few plants at margin of Chew Valley Lake, S, R.M.P. Already recorded from Blagdon Lake.

Potamogeton polygonifolius Pourr. With *P. berchtoldii* Fieb., pool, Lord's Wood, Hunstrete, S, R.S.C.

Groenlandia densa (L.) Fourr. Dundas Aqueduct, S, P.J.M.N. This pondweed is no longer common in the Bristol area. Also in the Dundas Aqueduct is *Potamogeton berchtoldii* Fieb., P.J.M.N.

Allium oleraceum L. Persistent near encampment, Weston-super-Mare, S, R.S.C., where found by G.P. Kidder in 1982.

Spiranthes spiralis (L.) Chevall. A single plant, Brean Down, S, C.K. and M.A.R.K.

Coeloglossum viride (L.) Hartm. A single flowering plant, damp meadow, Canada Farm, Shapwick Heath, S, R.S.C. Several plants of *Gymnadenia conopsea*

(L.) R. Br. were also present.

Ophrys apifera Huds. Several plants on grassy slope, Shute Shelve Hill, S, R.S.C.

Typha latifolia L. Much along the River Boyd at Wick Rocks, G, P.J.M.N. Also Weston Moor, Gordano Valley, S, I.F.G.

T. angustifolia L. A good patch amongst *Equisetum fluviatile* L., Priddy Pool, S, R.S.C. Nearby was *Asplenium adiantum-nigrum* L.

Scirpus setaceus L. Also *Senecio aquaticus* Hill and *Glyceria plicata* Fr., Coleford, S, R.S.C.

Cyperus longus L. A large clump still on the Kennet & Avon Canal in Bath, S, P.J.M.N., C.K., M.A.R.K. and R.M.P.

Carex pallescens L. Fruiting in damp meadow, Canada Farm, Shapwick Heath, S, R.S.C. Also *C. distans* L., *C. panicea* L., *C. nigra* (L.) Reichard, *C. ovalis* Gooden. and *C. pulicaris* L.

C. montana L. In quantity on rough banks above Cheddar Head Farm, near Priddy, S, R.F. In 1919 H.S. Thompson referred to 'several patches near Priddy'; this site may perhaps be one of them. *Coeloglossum viride* (L.) Hartm. is also nearby, and a fairly steady performer.

C. disticha Huds. Fruiting, Churchill, S, R.S.C. Also *C. pulicaris* L. in meadow here.

C. spicata Huds. Old railway line, Winscombe, S, I.F.G.

Festuca rubra L. ssp. *rubra* x *Vulpia myuros* (L.) C.C. Gmel. Among sown grasses (seed planted 1982) on the top of the gallery under St. Vincent's Rocks, Bristol, G, C.M. Lovatt, det. P.J.O. Trist. This hybrid is new to v.c. 34 and may have been introduced here (as many separate species have been) or derived *in situ* (*V. myuros* was plentiful in the area in 1982). Also in this site were *Festuca rubra* ssp. *commutata* Gaudin, conf. P.J.O. Trist and *F. rubra* ssp. *pruinosa* (Hack.) Piper, det. P.J.O. Trist.

Vulpia myuros (L.) C.C. Gmel. Abundant, old railway line, Sandford, S, R.S.C. A few plants in gravel path, Churchill, S, R.S.C.

Bromus madritensis L. Abundant in car park in a former quarry near Blackboy Hill, Durdham Down, Bristol, G, R.F.

B. racemosus L. St. Catherine's Valley, south of Marshfield, G, D.E. Green, det. P.J.O. Trist.

ALIENS. *Anemone blanda* Schott & Kotschy The Monument, Lansdown, near Bath, S, C.K. and M.A.R.K.

Barbarea intermedia Bor. Hundreds of plants in flower and fruit on disturbed ground at wood margin, Cheddar Wood, S, R.S.C.

Camelina sativa (L.) Crantz A single fruiting plant, Brislington Tip, S, A.L.G.

Kochia scoparia (L.) Schrad. s.l. Two plants among the now customary good crop of aliens on the railway line and parallel roadside at Cumberland Basin, Bristol, G, A.L.G. A single seedling of *Cannabis sativa* L. was also present, another species new to this site.

Lavatera trimestris L. A single plant on road verge, Downend, Bristol, G, A.L.G. This species is cultivated as a garden annual and is occasionally present in bird-seed, its probable source here, A.L.G.

Coronilla varia L. Several plants on grassy roadside bank, Shipham, S, R.S.C. Originally found here by G.P. Kidder several years earlier.

Potentilla norvegica L. Together with *Rorippa amphibia* (L.) Bess., *Sisymbrium officinale* (L.) Scop. var. *leiocarpum* DC., *Silene noctiflora* L., *Chenopodium album* L., *C. rubrum* L., *Melilotus indica* (L.) All., *Hyoscyamus niger* L. and *Lactuca virosa* L., in Goods Yard, Temple Meads Station, Bristol, G, A.L.G. and M.A.R.K., but the site subsequently destroyed. *L. virosa* also abundant nearby on waste ground and roadsides.

Prunus cerasifera Ehrh. Old railway line, Winscombe, S, I.F.G.

Sedum sexangulare L. Abundant on exposed rock outcrops, old quarried areas and old brickwork on the western side of the River Boyd at Wick Rocks and also about 1 km away at the old village on garden wall, Wick, G, P.J.M.N. White (*Flora of Bristol*, 1912, p. 323) notes this on 'two or three walls about Wyck', but it was observed, in 1924, by C.G. Trapnell ('Bristol Botany in 1924') to cover large spaces of exposed limestone on both sides of the valley.

S. reflexum L. In several places, walls, Stoke Bishop, Bristol, G, I.F.G.

Tellima grandiflora (Pursh) Dougl. ex Lindl. Near demolished house about ten years ago, Blaise Castle Woods, Bristol, G, Miss T. Hamand. Now disappeared, but cultivated specimen confirmed, I.F.G.

Cucumis sativus L. A single, well-developed specimen on road verge, Stoke Gifford, Bristol, G, A.L.G. This casual, growing where garden rubbish had been dumped, was one of the all-female glasshouse forms. The cucumber has been much mis-recorded in Britain because of frequent confusion with the melon, *C. melo* L., A.L.G.

Ficus carica L. One specimen on wall above stream, Croscombe, S, P.J.M.N.

Symphytum orientale L. Established for more than ten years on bank of railway, Clifton Down, Bristol, G, R.F.

Elodea ernstiae St. John (*E. callitrichoides* (Rich.) Casp.) Numerous female flowers, late September, Dundas Aqueduct, S, P.J.M.N. Previously recorded at this site (see 'Bristol Botany in 1956').

E. nuttallii (Planch.) St. John Puxton, S, P.J.M.N.

Lagarosiphon major (Ridl.) Moss In small quantity, Dundas Aqueduct, S, P.J.M.N. Formerly observed (1959) in a basin of the Kennet and & Avon Canal within Bath but not seen there since, P.J.M.N.

Endymion hispanicus (Mill.) Chouard x *E. non-scriptus* (L.) Garcke Reclaimed waste ground, Shirehampton, G, I.F.G.

Muscari botryoides (L.) Miller Old tip, Lawrence Weston, G, I.F.G.

Allium roseum L. Two plants in disused quarry, Cleeve Toot, S, R.F. Also along path near Prior Park, Bath, S, C.K. and M.A.R.K.

Bromus arvensis L. Several plants on roadside near Sea Mills, Bristol, G, A.L.G., where first noted in 1982. Although normally an annual, the single 1982 plant was very robust, much branched from the base and apparently behaving as a biennial. This grass is now very rare in the British Isles.

Digitaria ciliaris (Retz.) Koel. In crack of pavement in 1982, by riverside, Portway, Bristol, G, T.G.E.

Setaria verticillata (L.) Beauv. With *S. viridis* (L.) Beauv., *Digitaria sanguinalis* (L.) Scop., *Panicum miliaceum* L., *Amaranthus albus* L. and *A. retroflexus* L., Bathurst Basin, Bristol, S, C.K. and M.R.R.K., all det. A.L.G.

S. faberi Hermm. A large number of plants associated with grain sweepings, Avonmouth Docks, G, A.L.G. and T.G.E. This species, new to v.c. 34, is a first record for the Bristol area. It is somewhat intermediate between *S. italica* (L.) Beauv. and *S. viridis* (L.) Beauv. but is distinctive in its longer, narrower leaves which are hairy above and by its prominently wrinkled upper lemmas, A.L.G. Some further details on *Setaria* species are given in the *Wild Flower Society Magazine*, Spring 1984, under 'Alien Plant News' by A.L.G.

Panicum capillare L. Bathurst Basin, Bristol, C.K. and M.A.R.K., det. R.M.P. Also waste ground, roadside, Southville, Bristol, S, J.H. Scott *et al.*, Bristol Regional Environmental Records Centre.

BRYOPHYTES. *Sphagnum auriculatum* Schimp. var. *auriculatum* Harridge Wood, near Oakhill, S, J.A.

Ditrichum heteromallum (Hedw.) Britt. Steep bank, Harridge Wood, near Oakhill, S, J.A.

Barbula reflexa (Brid.) Brid. Whatley Bottom, near Frome, S, J.A.

Grimmia trichophylla Grev. var. *subsquarrosa* (Wils.) A.J.E. Smith On stone by stream, Ashwick Grove, near Oakhill, S, J.A. This taxon is new to Somerset.

Racomitrium canescens complex Three species of the *R. canescens* complex are now known to occur in Britain (see M.O. Hill '*Racomitrium elongatum* Frisvoll in Britain and Ireland', *Bulletin of the British Bryological Society*, February 1984, 21-25). Although the mainly calcifuge *R. elongatum* Frisvoll has not been recorded in v.c. 6 or 34, the other two British species of the complex are known in v.c. 6. Records for North Somerset made by J.A. and confirmed by M.O. Hill are as follows:- *R. ericoides* (Brid.) Brid., Shepton Forest, 1969; *R. canescens* (Hedw.) Brid., Blackdown 1966 (unusual form) , The Warren, Clevedon, 1966, and Hanham Ferry, 1967. The record given for *R. canescens* agg. in 'A Bryophyte Flora of North Somerset' by Mrs J. Appleyard (*Transactions of the British Bryological Society*, 1970, Vol. 6, Part 1, 1-40) for 31/35 is based on a specimen (not retained) from limestone turf near Hutton, S, which was probably *R. canescens*, J.A.

Bryum creberrimum Tayl. Stony clearing, Asham Wood, near Frome, S, J.A. This record is a first certain one for the county of Somerset. The moss was previously reported from v.c. 6 from Englishcombe, near Bath, in 1970 (see 'Bristol Botany in 1970' p. 21); this record was accepted as a first one for v.c. 6 in 'New Vice-county Records and Amendments to the Census Catalogues' in the *Transactions of the British Bryological Society*, 1971, Vol. 6, Part 2, p. 379. However, revision by A.J.E. Smith, reported in 'New Vice-county Records and Amendments to the Census Catalogues' in the *Transactions of the British Bryological Society*, 1974, Vol. 8, Part 1, p. 171, places this record in the 'Erroneous or indeterminable' category.

Zygodon baumgartneri Malta Harridge Wood, near Oakhill, S, J.A.

I thank everyone who has supplied records and assisted with these, notably Mr P.J.M. Nethercott, Mr A.L. Grenfell and Mrs J. Appleyard. Some records for 1983 not included in this article may be incorporated in the article for 1984. I am also indebted to Long Ashton Research Station for the supply of meteorological records.

PAST PRESIDENTS

WILLIAM SANDERS	1862
HENRY E. FRIPP	76
GEORGE FORSTER BURDER	80
JOHN BEDDOE	83
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506.42

VOLUME 44 Price £2.00

1984

PROCEEDINGS

OF THE

Bristol Naturalists' Society

EDITED BY T.E. THOMPSON
ASSISTED BY A COMMITTEE

"Rerum cognoscere causas" – Virgil

SMITHSONIAN
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Mr A.E. FREY,
DEPARTMENT of GEOGRAPHY,
UNIVERSITY OF BRISTOL,
BRISTOL, BS8 1SS

NOT LATER THAN 28th FEBRUARY, 1986.

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Miss R.C. LEE,
68 THE DELL,
WESTBURY-ON-TRYM,
BRISTOL, BS9 3UG

All other communications should be addressed to the Hon. Secretary:—

Miss A. HECKELS, B.Sc.,
8 RIDGEWOOD, KNOLL HILL,
SNEYD PARK,
BRISTOL, BS9 1QZ

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ISSN 0068–1040

PROCEEDINGS OF THE BRISTOL NATURALISTS' SOCIETY

VOLUME 44

1984

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	- Hon. Secretary:	H.E. ROSE, B.Sc., Ph.D.

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Miss M. JERVIS M.A.
M.A.R. KITCHEN
Mrs C. KITCHEN
C. LITTLE, B.A., Ph.D.
Mrs M. POOLMAN
R.G. THOMAS (died May 1984)

BRISTOL NATURALISTS' SOCIETY

INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER 1984

1983 £		£
	Income	
2760	Members' subscriptions	2607
12	Donations	93
96	Sales of Proceedings, author's contributions and grant	217
52	Sales of books and membership lists	30
24	Buffet Supper, profit	49
-	Steep Holm Trust, refund	14
93	Field Committee - profit (loss) on meetings	(16)
136	Interest	181
3173		3175
	Expenditure	
565	Printing, stationery and typewriter repairs	823
361	Postages & telephone	462
1172	Proceedings (1983-£858) Bird Report (1983-£436)	1294
111	Library, books	90
147	subscriptions & purchases of journals	139
15	fire insurance & library expenses	81
8	Donations	7
238	Indoor meetings	277
325	Grants to Sections	260
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231	Profit (Loss) for year	(258)

BRISTOL NA

BALANCE SHEET

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P.J.M. Nethercott
Hon. Treasurer
12 February 1985

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.B. Silcocks
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0 February 1985

BRISTOL NATURALISTS' SOCIETY

SPECIAL FUNDS

Receipts and Payments for the year ended 31 December 1984

1983 £		£
	Harry Savory Illustrations Fund	
232	Fund at 31 Dec 1983	232
-	Less cost of illustrations in 1983 Proceedings	28
232	Fund at 31 Dec 1984	204
	Conservation Appeal	
122	Fund at 31 Dec 1983	193
71	Additions to Fund in 1984	11
193		204
-	Payment to Bristol Waterworks Co. for work at Chew Valley Lake	120
193		84
	Hector Hockey Memorial Fund (created 1984)	
-	South Brecon Field Study Centre Fund at 31 Dec 1984	4000

BRISTOL NATURALISTS' SOCIETY

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	Represented by		
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193	Conservation Appeal		84
-	Hector Hockey Memo Fund		4000
173	Field Committee acc		157
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NOTES (1) No value placed upon the contents the library and stock of lications.

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P.J.M. Nethercott
Hon. Treasurer
12 February 1985

T.B. Silcocks
Hon. Auditor
20 February 1985

BRISTOL NATURALISTS' SOCIETY

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193		84
	Hector Hockey Memorial Fund (created 1984)	
-	South Brecon Field Study Centre Fund at 31 Dec 1984	4000

GENERAL & SECTIONAL PROCEEDINGS

REPORT OF COUNCIL, 1984

Membership at the end of the year stood at 574.

At the AGM The Officers and Members of Council were elected with Mr V. Dennison as President.

The Annual Buffet Supper was held in May when Mr J. Eatough spoke on "Island Adventure - West Wales and the Outer Hebrides".

The Trustees of the South Brecon Field Centre have donated to the Society a sum of the order of £4000. The money will be held in trust and the interest used to aid study and conservation projects in the field of natural history. A sub-committee will be set up to administer the fund, which will be known as the Hector Hockey Fund.

The monies collected for the Woodland Trust in memory of Dr A.F. Devonshire has reached a total of £304.

The Society wishes to place on record the fact that Mr S.M. Taylor member of Council and a past President, has completed four years as President of the BTO.

We record with regret the deaths of the following members: Dr M.C. Smith, Dr G.G. Harthill, Mr R.G. Thomas, Mr C.M.V. Cane, Mr J.R. Hayward.

ACCOUNT OF GENERAL MEETINGS, 1984

Jan:	Presidential Address - "Formation of Landscape", by Mr V. Dennison.
Feb:	Film Evening from the Shell film library.
Mar:	"Wildlife Management and Farming", by Mr R.G. Symes.
Oct:	"The Biology of Lizards", By Dr R.A. Avery.
Nov:	"Forms of Life in Thermal Pools", by Professor A.E. Walsby.
Dec:	"The Making of BBC TV's 'Natural World' Programme", by Mr Barry Paine.

GENERAL FIELD MEETINGS, 1984

28 Jan	Miss R.C. Lee & Dr H.E. Rose. A morning visit to Slimbridge. Excellent views of wild geese and duck on the saltings. These and the main collection were seen in ideal conditions of brilliant sun.
25 Feb	Mr D.A.C. Cullen. A morning visit to Chew Valley Lake. Water level very high so no great numbers of birds, and a bitterly cold day, so shelter of the hides was appreciated. Two female Smew on Heriot's pool and a large flock of Meadow Pipits on migration in one field. Good views of many passerines in one of the lanes.
25 Mar	Mr L. Cram. A walk through Long Wood and Velvet Bottom, Mendip. A variety of lichens and mosses and early spring flowers were seen. In Velvet Bottom the leader explained the lead-smelting process in operation at the end of the last century, which had left its mark on the landscape. A very wet day with very few birds seen.
20 Apr	Miss M. Jervis. A walk along the Quantock ridge from Crowcombe Park Gate and down Hodder's Combe. A warm, sunny but hazy day. A few early migrants heard and three Buzzard seen. Excellent view of up to twelve red deer hind and young stags only 100 yards away.
9 May	Mr D.A.C. Cullen. Evening walk from Tintern over Chapel Hill. Bird song and spring flowers.
13 May	Miss R.C. Lee & Mr B. Gray. (Joint meeting with Ornithological

Section). Wye Valley. Morning walk over Barbadoes Hill from Tintern. Good bird song and woodland flowers. Afternoon walk from Redbrook along the side of the R. Wye to Bigsweir. Summer migrants seen and heard, also three Sparrowhawks.

29 May Mr A.C. Titchen. Evening walk from Keynsham to the R. Avon and back over the 'Humpy Tumps'. Very rewarding botanically, especially the finding of the Upright Chickweed, *Moenchia erecta*. Some bird song from spring migrants.

9 Jun Miss M. Jervis. Morning walk over the unimproved downland of Eggardon Hill, Dorset - chalk flowers, fine view and Iron Age earthworks. Afternoon visit to the important conservation area of Powerstock Common, rich in butterflies, dragonflies, birds and orchids, led by Mr & Mrs Newsom Davis of the Dorset Naturalists' Trust.

20 Jun Dr N. Malcolm. Priddy Mineries and the Waldegrove Pool. An evening walk past the pools and the remains of the Chewton and St Cuthberts Lead Works, looking at the distinctive flora (over 100 species) and recalling the days of the lead workings.

7 Jul Mr R.M. Payne. Morning walk over the common land of Burrington Ham - limestone flora and views over Wrington Vale. Afternoon climb on the slopes of Blackdown and its Old Red Sandstone flora. A small area of bog with many typical bog plants was examined. A very hot day but much enjoyed.

4 Aug Miss I.F. Gravestock & Miss R.C. Lee. Rewarding walk along the old railway track at Congresbury and Winscombe: many butterflies and a variety of flowers noted. Dry day and sunny afternoon following a thunderstorm as the party left Bristol.

8 Sep Mrs V.J. Kenney. Vallis Vale to Nunney - an interesting and varied walk through woods, along by streams and past quarries. Good views of Dipper, Grey Wagtail and Kingfisher. The village of Nunney with its castle and church was also visited.

27 Oct Miss M. Jervis. A visit to Selsley church, nr Stroud, in the morning, followed by a walk from Coaley Peak nr Nympsfield through Buckholt wood. Autumn colouring beginning. One or two late summer flowers noted. Magnificent views from Coaley Peak.

1 Dec Mr D.A.C. Cullen. Durleigh Reservoir And Steart. Very rewarding day despite dull weather. Big flocks of duck at Durleigh and an excellent view of a fox. Good views of large flocks of waders both on the mud and in the air were had at Steart, despite rain. Highlight was good view from the hides at the point of a Great Skua, preening and later flying.

REPORT OF THE BOTANICAL SECTION, 1984

At the Annual General Meeting, held in the Schools Room of the City Museum on 23 January 1984, the following were elected:- President: Lady Rosemary FitzGerald; Hon. Secretary & Treasurer: Mr A.C. Titchen; Committee: Mr R.M. Payne, Mr A.L. Grenfell, Dr C.M. Lovatt, Mr M.A.R. Kitchen, Mrs C. Kitchen, Miss I.F. Gravestock, Mr P.J.M. Nethercott, Mrs M.A. Silcocks, and Mrs N. Vaughan Davies.

The following winter meetings were held:

23 Jan Annual General Meeting & Members' Evening.

27 Feb	Symposium - Sand Dunes.
22 Oct	"Fungi", by Mr J.G. Keylock.
26 Nov	"The Welsh Flora", by Mr G. Ellis.
10 Dec	Members' Evening - Short Talks: "Ferns", Mr R.M. Payne; "Broomrapes", Mr J. Scott; "Conifers", Mr A.C. Titchen.

The following field excursions took place, under the leadership of those shown:

28 Apr	Kew Gardens, Mr A.C. Titchen.
27 May	Cleeve & Congresbury, Lady Rosemary FitzGerald.
29 May	Keynsham, Mr A.C. Titchen.
8 Jun	Lanes of Stoke Bishop, Miss I.F. Gravestock.
17 Jun	Crymlyn Burrows, Swansea, Mr A.L. Grenfell.
14 Jul	Brambles of the Avon Gorge, Dr C.M. Lovatt.
28 Jul	Rodway Hill, Mr P.J.M. Nethercott.
11 Aug	Trees of Redland, Mrs N. Vaughan Davies.
15 Sep	Sharpness Docks, Mr A.L. Grenfell.

The following evening meetings were held in ST 56 in connection with the Avon Flora Project:

24 May	Chew Magna, Mr R.M. Payne.
15 Jun	Butcombe, Dr C.M. Lovatt.
19 Jul	Yanleigh, Mr A.L. Grenfell.
17 Aug	Burrington Combe, Mrs N. Vaughan Davies.

The Section has had a successful year with both winter and summer meetings well attended. The Committee thanks members for their support.

A.C. TITCHEN, Hon. Secretary

REPORT OF THE ENTOMOLOGICAL SECTION, 1984

At the Annual General Meeting held on 12 January 1984, the following officers were elected: President: Mr R.M. Payne; Hon. Secretary: Dr R.H. Poulding; Hon. Treasurer: Mr R.W. Rowe; Committee: Mr H.K. Barton, Mr G.R. Best, Mr R.S. Cropper, Mr K.H. Poole, Mr S. Randolph, Mr G.W. Sorrell and Mr A.H. Weeks.

The winter programme of indoor meetings held at the City of Bristol Museum and Art Gallery was as follows:

12 Jan	Annual General Meeting.
9 Feb	Recorders' and Members' Evening.
15 Mar	"Some Insects of Avon & District", by Mr E.A.F. Dean.
11 Oct	Annual Exhibition & Members' Evening.
8 Nov	"The Dragonflies of Avon & District", by Mr J. Holmes.
13 Dec	"Tsetse Flies", by Dr A.M. Jordan.

Field excursions arranged as part of the summer programme:

19 May	Midger Wood, Lower Kilcott, GTNC/AWT Reserve, Mr H.K. Barton.
30 Jun	Charterhouse, Mendip, Mr R.M. Payne.
21 Jul	Bourton Combe, nr Flax Bourton, Mr A.H. Weeks.
19 Aug	Great Breach Wood, nr Compton Dundon, STNC Reserve, Mr E.A.F. Dean.

In addition, six survey meetings were held from April to September at Middle Hope, nr Weston-super-Mare as part of the insect survey project of this National Trust and SSSI area.

The Section has had another successful year with the increased level of membership participation maintained in the various activities planned by the Committee. The most popular field excursion was to Midger Wood Reserve in May when 17 members attended, whilst the illustrated talk on dragonflies in November attracted 35 members and guests. Individual members assisted with surveys of AWT and NT reserves and a survey of Littleton Brick Pits, another AWT reserve, was started by three members. The close links with the Bristol Regional Environmental Records Centre was maintained with further exchanges of records and also with a change of the recording area for the Avon & District Entomological Report to coincide with that used by BRERC covering vice-counties 6 and part of 34.

R.H. POULDING, Hon. Secretary

REPORT OF THE GEOLOGICAL SECTION, 1984

The following officers were elected at the Annual General Meeting, held on 19 January 1984:- President: Mr M. Curtis; Vice-President: Dr A.B. Hawkins; Secretary/Treasurer: Mrs G.B. Castle; Assistant Secretary: Mr D.A. Wilson; Field Secretary: Dr D. Hamilton; Committee: Mr D. Cope, Miss A. Dugdale, Mrs G. Hamilton, Mr N. Hollingworth, Mrs M. O'Leary, Mr P. Thomson and Mr V. Dennison (ex-officio).

The following winter meetings were held:

18 Jan	"The Bristol Avon Valley", by Dr A.B. Hawkins.
15 Feb	"Geology of the Aldbury Bypass", by Mr T. Ralph.
14 Mar	"The Rhaetic", by Mr J. McQuaker.
10 Oct	"The Wealden of the Isle of Wight", by Dr A. Insole.
21 Nov	"River Sediments of the Severn and the Hampshire Basin", by Mr D. Cope.
12 Dec	Members' Evening - Short Talks: "Dating Norwegian Glaciers", by Mr V. Dennison; "Peats", by Mr D. Cope; "Hock Cliff", by Mr D.A. Wilson.

Four field trips were held:

8 Apr	Soils of Mendip, Mr D. Cope.
20 May	Lavernock Point & St Mary's Well Bay, Mr J. McQuaker.
9 Jun	Goblin Combe Volcanics, Mr W.J. Draper.
30 Sep	Staple Edge Trail, Forest of Dean, Mr A. Mattheson.

DAVID WILSON, Hon. Secretary

REPORT OF THE ORNITHOLOGICAL SECTION, 1984

Seven indoor meetings were held during the year including a joint fieldwork meeting with the Bristol Ornithological Club. The quality of the invited lectures was very high, both in scientific content and in general interest. The speakers were Dr R. O'Connor, Dr M. Moser, Mr A. Parsons and Mr M. Owen. Twenty-six fieldwalks were arranged with a good attendance at most of them. Many species were recorded often in ideal conditions.

As usual the Section was involved in a number of surveys, both local and national. Perhaps the most notable was the completion of the winter atlas project for Avon, part of the national project organised by the BTO. We owe a debt of gratitude to Richard Bland for his work on this project. Other national surveys included a Wood Warbler breeding survey, the nest record card scheme, the birds of estuaries enquiry, and birds in gardens. Local projects included a study of the Stonechat, a census of breeding raptors and the continuing study of overwintering warblers. All these projects were undertaken jointly with the Bristol Ornithological Club.

For the first time the Avon Bird Report was produced by the Avon Ornithological Group, the 1983 edition appearing in October. A number of members of the Section put a lot of time and effort into its production which was considered a success. The new group is now well launched and should be successful for many years to come.

The Section sustained a great loss during the year with the death, in May, of Ray Thomas. He was President of the Section from 1976 to 1978 and was one of the Section's most active members over many years. During this year he gave a fascinating talk on the birds of Morocco, led a number of fieldwalks and helped with the production of the Bird Report. He had attended a fieldwalk on the day he died. His death is and will remain a great loss to us all.

Apart from this loss I feel that the Section has had a successful year. The slight decline noted in last year's report does not seem to have been repeated, although we would welcome some new members, particularly young ones.

H.E. ROSE, Hon. Secretary

REPORT OF THE LIBRARIAN, 1984

Mrs Marion Gray retired as Honorary Librarian at the end of 1983. It has not so far been possible to find anyone to take her place and work on the library during 1984 has been shared between members of the Library Committee. Mrs Gray became Librarian in 1981 but although her term of office was relatively brief, she devoted a considerable time to her duties and showed a notable thoroughness in their execution. She began the treatment of leather bindings with hide food and with meticulous care produced labels for many of the Reprint Boxes and library shelves. She was also a tower of strength when the Library had to be cleared of books during the rebuilding work and later when it was time to bring them back again.

By the beginning of 1984, the Library Room was ready for occupation again after most welcome improvements, including new, concealed lighting, redecoration of the walls and new vinyl tiles on the floor. The central heating now works again and the relative humidity can be kept at a reasonable level with the help of a dehumidifier on loan from the Museum. The books and journals were moved back in the early part of the year and replaced on the shelves in a new arrangement reflecting the Dewey Classification. The Library was first reopened to members on 21 July. Since then 56 visits have been made by 25 members who between them borrowed 117 items. Since 1982, 12 books have been bought. Three books and several issues of journals have been donated, for which our thanks are due to Mr P.J.M. Nethercott, Miss O.M. Shearer and Miss D.I. Parsley.

We would like to express the Society's thanks to the Director, City Museum and the Director, City Art Gallery for the continuing use of the Library Room and also to record our gratitude to the late Mr Douglas Harmer, who was Director of the Museum and Art Gallery, for the improvements which have been made to the room. We would also like to put on record the Society's indebtedness to the University Librarian for accomodating our books while the Library Room was out of use and to Mr Clive Ward of the Law Library of the University for help while our books were under his care.

ANNE HOLLOWELL, Chairman, Library Committee

OBITUARY

HECTOR GEORGE HOCKEY (1909-1983)

We record with regret the death of Hector George Hockey on 6 February 1983. He joined the Society in 1954, became a member of the Field Committee in 1957, and was its Chairman from 1959 until 1980. He himself led well over a hundred general field meetings, as well as occasional Section meetings. His notable service was recognised by election to Honorary Membership in 1972.

Hector Hockey was born at Kingswood, Bristol on 18 May 1909, but grew up in the Weston-super-Mare area, where his father became a gamekeeper. He developed a love and practical knowledge of natural history through the influence of two local characters, scoutmaster Noel Partridge and Harry Cox the warden of Brean Down and Steep Holm. During the war, denied an active role by a skull fracture sustained in 1930, he served in the police on the Somerset Levels, gaining a deep knowledge of the area. He became a member of the Mid-Somerset Naturalists' Society. Later, regular weekend excursions extended his close acquaintance with the contryside to a wide radius round Bristol, which was of great use to the Field Committee. His work as a builder allowed him to study the natural history of Bristol, and around his home at Stapleton he took a particular interest in the wildlife and its conservation.

In 1969 he realised an ambition by recruiting a group of kindred spirits, mostly from this Society, into a charitable trust which set up the South Brecons Field Study Centre, where old and young could experience and study the scenery, wild life and archaeology of the area. He saw this as in some measure repaying the help given to him in his youth. Much of his energy, skill and limited resources were devoted to the centre, and he remained its mainstay even when both efforts and resources were restricted after a car accident in August 1971 in which he and his wife were seriously injured. Use of the centre declined with soaring travel costs, and in 1981 the Trustees closed it and sold the property. In due course one-third of the proceeds came to this Society to be held in trust as the Hector Hockey Fund, the income from which will support studies and conservation projects in the general field of natural history. The fund is a fitting memorial to a fine country lover and naturalist, and this obituary was held over from last year's *Proceedings* so that its formation could be announced.

The Society extends sympathies to his widow and to his two sons by his first marriage.

S.M. Taylor.

INSTRUCTIONS TO AUTHORS

1) Original papers will be considered for publication if they contain material of relevance to the natural history of the Bristol region.

2) The copyright of all published matter shall be the property of the Society, whose Council has power to permit reproduction.

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6) References should be listed in alphabetical order at the end of the manuscript, taking the following form:

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7) Line drawings should be in black ink on white paper or card, and all scales and labels should be inserted by the author(s). Drawings, tables, etc. should not exceed 160 mm (6¼") in width and 235 mm (9¼") in depth. Photographs and drawings will be returned on request.

8) Brief captions to the illustrations should be gathered together to form an addendum to the manuscript.

9) A shortened version of the title suitable for page-headings should be supplied.

10) One set of proofs will be supplied; corrections must be kept to a minimum.

Proceedings of the Bristol Naturalists' Society (1984), **44**: 13–14

PHOSGENITE FROM CLEVEDON, AVON

by R.E. STARKEY
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REPORT

Phosgenite is rare in the British Isles, known from only half-a-dozen or so localities. The classic locality is Bage Mine, Wirksworth, Derbyshire, which produced several fine specimens with crystals up to 6.5 cm long. More recently phosgenite has been described from Newporth Beach, Falmouth, Cornwall (Dean *et al.*, 1983). This note describes a further occurrence at Clevedon, near Bristol, Avon.

Phosgenite occurs in barytes pebbles associated with galena, commonly showing a charcoal grey alteration, together with iron staining, suggesting that adjacent pyrite may have decomposed during the oxidation of the galena. Crystals of phosgenite up to 1.5 mm on edge have been collected, and these occur in several forms - the most common being a modified cube, and a complex prism. Relatively few elongated crystals with pyramidal termination have also been found.

The coast at Clevedon exposes a section through the Devonian Portishead Beds and the Carboniferous Lower Limestone Shale Group, overlain unconformably by Triassic Dolomitic Conglomerate. The Dolomitic Conglomerate is faulted to the west of the Pier Hotel, and the fault plane is marked by a prominent cliff feature. This face exhibits traces of barytes mineralisation with minor amounts of galena and secondary copper minerals. On the beach below the Pier Hotel, west of the Pier, (national grid reference ST 4015 7185) are many large boulders of prominently banded barytes and dolomitic conglomerate up to 1 m across, derived from the mineralised fault. The boulder material contains clasts of limestone and occasional fossil fragments.

The large boulders contain cavities up to 12 cm across, lined with pale cream to pink crystals of cockscomb barytes, on which occur crystals of chalcopyrite altering to pseudomorphous limonite, together with white rosettes of acicular aragonite crystals to 4 mm, bright green malachite globules to 2 mm, and superb dark blue euhedral crystals of azurite. The azurite crystals are worthy of note for their perfection and size - to 5 mm long, and exhibit many complex forms. Massive galena is present to a greater or lesser extent in most of the boulders.

In the mud on the beach, and behind the larger boulders, small barytes pebbles up to 10 cm across are found. These pebbles are rich in galena and show a higher degree of alteration than do the larger boulders. Minerals identified from the pebbles include - aragonite, aurichalcite, azurite, brochantite, cerussite, chalcopyrite, native copper, covellite, cuprite, galena, malachite, phosgenite and native sulphur. In all cases crystals are of microscopic size - up to 2 mm.

Earlier workers have reported galena and barytes with a little malachite and chessylite in dolomitic conglomerate from near Clevedon Pier (Russell, 1944), and also galena from the Clevedon dolomite with a peculiar configuration so that the cubes are built up into crystals resembling stiles and gates etc. (Stoddart, 1877). Gold in minute quantity has been reported from Clevedon, together with galena and malachite (Grenfell, 1873).

The occurrence of phosgenite in beach pebbles is strikingly similar to the classic Laurium occurrence in Greece, where rare lead chlorides have formed in ancient slags as a result of reaction with seawater (Kohlberger, 1976). The Clevedon occurrence is clearly analogous with the recent

Newporth Beach discovery (Dean *et al.,* 1983), but at Clevedon, phosgenite has not so far been found *in situ*.

Specimens from the occurrence have been deposited in the collections of the British Museum (Natural History), London and the National Museum of Wales, Cardiff.

ACKNOWLEDGEMENTS

I would like to thank the Department of Mineralogy, British Museum (Natural History) for confirmation of the phosgenite by X-ray powder diffraction, and Drs R.F. Symes and P.A. Williams for helpful discussion.

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SNAIL HOLES IN MENDIP LIMESTONE

by W.I. STANTON
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INTRODUCTION

Although marine and freshwater molluscs can bore holes into stone and authors a century ago believed this to be so for the land snails *Helix aspersa* (Taylor, 1894; Swanton,1912) and *Cepaea hortensis* (Cooke, Shipley & Reed, 1895), there is no recent evidence supporting this suggestion for land snails. This paper describes the features of deep tubular holes that are locally common in Carboniferous Limestone outcrops in the Mendips, and attributes their formation to the action of a land snail, *Cepaea nemoralis*, which frequently occupies them.

FORM AND SHAPE OF THE TUBULAR HOLES (FIG. 1)

The tubular holes here described are distinguishable by their characteristic shapes and dimensions. In form they vary from simple to complex. The typical simple hole is a cylindrical tube about 20 mm in diameter and up to 50 mm long, that rises vertically from an overhanging limestone surface. The sides of the hole are rounded and smooth, and it has a blunt rounded upward termination.

Larger more complex holes are branched, with several tubes departing from the central one in a generally upward direction. The hole is wider and as much as 200 mm long. Sharp fluted edges are present where the curved surfaces intersect each other. If complex tubular holes are close together they may merge to form a rock honeycomb where over a small area there is more void than rock. On vertical rock faces the holes are often

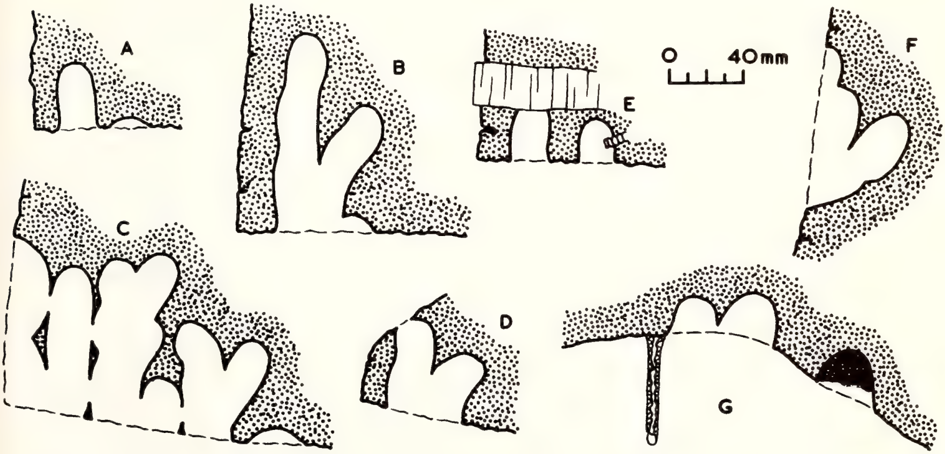

Figure 1. Sections illustrating common features of snail holes. (A) Small simple hole and scrape. (B) Larger, more complex hole. (C) Rock honeycomb at outer edge of overhang. (D) Small complex hole with eyehole. (E) Simple holes with flat roof at chert bed and projecting siliceous fossil. (F) Complex hole in sub-vertical rock face. (G) Possible snail holes in roof of cave entrance, with stalactite and mud fill.

exposed in long section as half-tubes where the partition between the hole and the rock face has been eroded away.

Although the holes normally rise vertically from overhangs they sometimes go in horizontally from a vertical rock face or crack, then turn upward. Some holes start in cracks that are no wider than the hole itself.

Characteristic of the holes are their smooth almost polished internal surfaces that contrast with the rough external limestone surfaces sculpted by weathering. However, where the limestone contains siliceous fossils the holes may terminate upwards in, or sidestep around, jagged projections. One hole ended at a flat roof of hard insoluble chert. Snail slime and droppings often coat the insides of the holes.

OCCURRENCE OF THE TUBULAR HOLES

The holes are commonest, largest and most complex in the low cliffs and rock exposures that occur on the slopes of the 'closed basins' of the Mendip plateau (Ford & Stanton, 1969; Barrington & Stanton, 1977). In general the lowest outcrops in the basins have the most holes. Elsewhere they occur in limestone outcrops on the sides of shallow valleys, in sinkholes, in the rare vestigial limestone pavements, and on the great outward-facing escarpments. They tend to be most concentrated in small isolated outcrops surrounded by grass, bracken or other vegetation; in large outcrops they are most common in the marginal areas and rare in the centre. They are absent from the smooth rounded rock surfaces exposed by recent soil erosion.

In rock faces on the lower sides of Cheddar Gorge and other deep dry valleys the holes are rare to absent, but they are locally present on the upper sides. On the lesser hills offset from the main mass of Mendip they can usually be found in suitable limestone outcrops. Some are in woods, others in grassland; environments which have not, of course, been constant over the centuries.

In all these outcrops the holes are normally found at heights of one metre or less above the ground. They are commonest at the outer edges of rock overhangs. In a particular overhang there are usually no more than one or two holes or groups of holes occupying only a fraction of the total area.

In the opencast lead workings of the Chancellor's Farm and Charterhouse orefields (Stanton, 1981), of Roman to medieval age, short simple tubular holes are sparsely distributed near the tops of the rock faces, usually less than 2 m below the external ground level.

Mendip limestone was worked for wallstone and lime burning in shallow pits about 150 to 200 years ago. In these workings, simple holes seldom more than 20 mm long, sometimes mere shallow scrapes, can be found on man-made rock faces that are otherwise little affected by weathering.

Some of the Chancellor's Farm workings are in a conglomerate (Dolomitic Conglomerate) consisting of pebbles and boulders of various rock types set in a marly matrix. Usually the tubular holes in this conglomerate are restricted to limestone boulders, but a few are developed in the matrix where it is particularly calcareous. At Stanton Drew, between the Mendips

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PLATE 1 (FACING PAGE) (A) Group of five simple snail holes containing two adult *Cepaea nemoralis*, and an isolated small narrow simple hole developing from a scrape (photograph looking vertically upward).

(B) Group of three simple and two complex holes beneath sloping overhang.

(C) Simple and complex holes, some exposed in long section, developed along outer edge of sloping overhang.

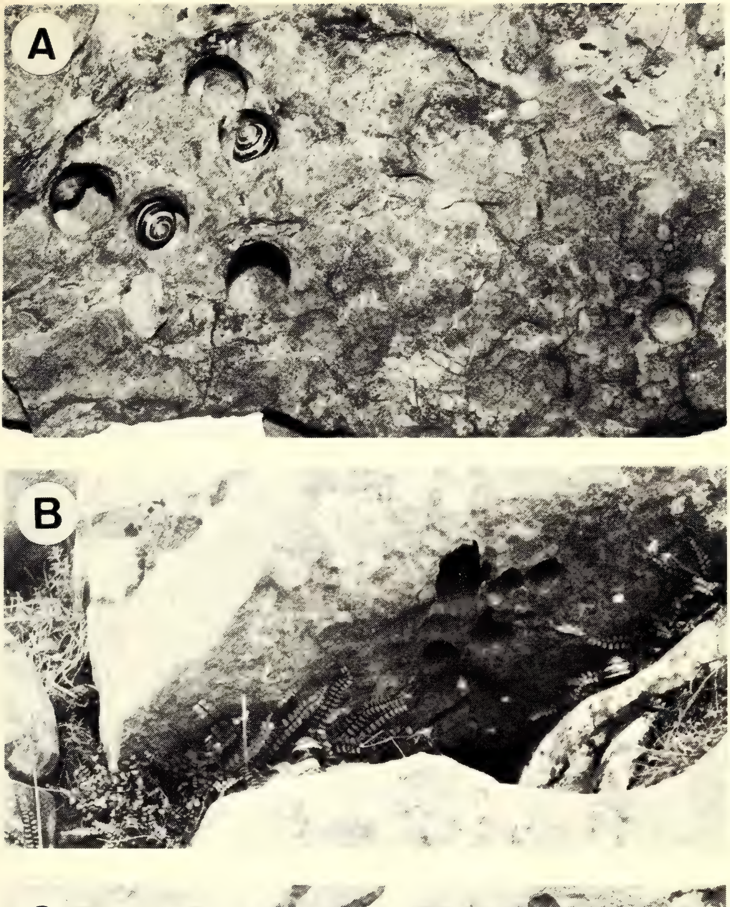

PLATE 1

and Bristol, a tall standing stone in the Cove (Bronze Age monument c. 4000 years old) consists of a rather similar conglomerate having large tubular holes in limestone boulders and calcareous matrix. Those in the matrix, which contains irregular siliceous veins, have jagged interior surfaces where the silica projects into the hole.

Outcrops of Jurassic limestone in the Cotswolds and at Portland Bill have been vainly searched for tubular holes. Nor have such holes been found in the beds of dolomite (calcium-magnesium carbonate) that occur on Mendip among the normal calcium carbonate limestones, or in any non-calcareous rock.

RELATION OF SNAIL SPECIES TO THE TUBULAR HOLES

Of 29 tubular hole localities studied in detail, at only 8 was *Helix aspersa* observed on the rocks or in the adjacent vegetation. At the Cove at Stanton Drew large empty shells of *H. aspersa* were found jammed among siliceous projections inside one or two complex holes, but at only one site, in a wood near Wells, were live individuals found occupying the holes.

In contrast, the 'grove snail', *Cepaea nemoralis* (kindly identified by Dr T.E. Thompson) was present at 27 localities, often in large numbers. At 22 sites individuals were occupying tubular holes, sometimes several in one hole. At the wallstone quarry sites *C. nemoralis* was common, often occupying holes and scrapes, but *H. aspersa* was rare.

Other snail species were noted in and near the tubular holes, but in ones and twos compared to *H. aspersa* in tens and *C. nemoralis* in hundreds.

C. nemoralis adults at c. 18 mm diameter will fit neatly into all but the shortest simple holes. They are significantly smaller than *H. aspersa* adults which reach about 30 mm diameter and are much too large to enter most simple holes.

H. aspera is the large brown snail common in gardens and elsewhere. *C. nemoralis* is also known as 'dark-tipped banded snail', with variable banding usually in yellow and black.

DISCUSSION AND CONCLUSIONS

Several thousand tubular holes have been examined, at some 60 widely separated localities. Their characteristic and instantly recognisable forms, each of which finds a place on the sequence: shallow scrape - simple hole - complex hole - rock honeycomb, are too regular and well-defined to be the product of random weathering. Indeed, their favoured situation beneath rock overhangs is largely protected from the weather. Their predictable occurrence, in restricted sectors of limestone outcrops in particular environments, indicates that they are formed by a selective process.

Their presence in quarries only 200 years old proves that they are still forming at the present time, at a rate that can reach 15 mm in 100 years. This rate is significantly faster than the average rate, c. 5 mm in 100 years, at which limestone surfaces are degraded by weathering (Atkinson, 1971).

It is difficult to propose a realistic process whereby the tubular holes can be formed by inorganic agencies. In particular it would have to account for the fact that the simple holes, and the branches of the complex holes, are always a neat fit to the adult shells of *C. nemoralis*, but are never so narrow that this snail cannot reach the far end.

In summary, the tubular holes are

a) forming at the present time,
b) regularly occupied, except in winter, by *C. nemoralis*,

c) without exception, in thousands of examples, proportioned to fit adult individuals of *C. nemoralis*, without ever being too small,
d) restricted in occurrence to those parts of calcareous rock outcrops that are or have been closely adjacent to vegetation.

It is therefore concluded that the tubular holes are produced by the activities of the land snail *Cepaea nemoralis* and may properly be called "snail holes".

The shallow scrapes, common in wallstone quarries, allow the growing ends of snail holes to be studied. In them the rock surface often appears cleaner than its surroundings, as though it had been rasped or licked by the snail. Where a simple hole less than 10 mm long is developing from a scrape it is sometimes too narrow to accept the shell of an adult *Cepaea nemoralis*. This indicates that the excavation is carried out by the soft mouth parts of the snail, as would also be necessary for the removal of limestone from the narrow crevices between siliceous fossils.

The snails evidently prefer to enlarge existing holes rather than start new ones, a manifestation, perhaps, of the homing instinct noted by Swanton (1912). Thus each hole will be 'home' to successive generations of snails over many centuries. Simple holes develop into complex ones over time spans that must be measured in thousands of years.

Small isolated limestone outcrops, and the margins of large ones, are the main home areas of snails that forage in the surrounding vegetation. The value of the holes as concealed resting places for snails is obvious, but they do not seem to be used as winter hibernation sites. In the 1984-85 winter no live individuals of *Helix* or *Cepaea* were found in snail holes, though many were examined.

Finally it is emphasised that the typical simple snail hole is much too narrow to accept *H. aspersa* adults. All the evidence points to *C. nemoralis* as the principal hole-boring snail of the Mendip region.

NOTE: Like stalactites in caves, snail holes are hundreds or thousands of years old and cannot be replaced. Protect them from damage.

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WEST SEDGEMOOR - ITS PEAT STRATIGRAPHY AND PEAT CHEMISTRY

by S.M. ROSS & A.L. HEATHWAITE
(Department of Geography, University of Bristol)

INTRODUCTION

A large proportion of the peat moors of the Somerset Levels lie between 3 and 10 m OD and below the mean high water spring tide in the Bristol Channel. The water table is close to the ground surface over most of the Levels and many areas are prone to spring flooding. Flood prevention and land drainage in the area date from the 15th and 16th centuries and pump drainage schemes powered by windmill were becoming common, especially in Kings Sedgemoor, as early as the 1640's. Currently, intensive pump drainage schemes are in operation throughout the Levels, co-ordinated by Wessex Water Authority and the local Internal Drainage Boards.

The conflicts of opinion surrounding agricultural land drainage and nature conservation on the Somerset Levels has been widely aired in recent years. Much attention has been focussed on West Sedgemoor, the most southerly of the peat basins, and the most recent to be partly pump drained, since its designation in 1983 as a Site of Special Scientific Interest by the Nature Conservancy Council. Despite the fact that approximately 50% of the land area of West Sedgemoor is owned by the Royal Society for the Protection of Birds, the installation of six drainage pumps since 1977 now means that more than 30% of the basin is hydrologically managed, particularly during the winter and spring months. This increase in drainage activity has alerted the conservation lobby to the possibility of environmental alteration and a possible loss of the valuable wetland habitat of the moor. Studies are currently underway to monitor the invertebrate life (Nature Conservancy Council), the flora (Ministry of Agriculture, Fisheries and Food/Nature Conservancy Council) and the drainage water quality (Wessex Water Authority) in West Sedgemoor. The material reported in this paper represents a small part of a programme to study peat chemistry and peat water quality on drained and undrained peat in West Sedgemoor and to look at their seasonal relationship.

Peat stratigraphy in the Somerset Levels has been documented since the 1940's (Godwin, 1941; Godwin, 1955) and more recently by the Somerset Levels Project (eg. Beckett, 1978; Casteldine, 1980, 1984) but such records have concentrated on areas around the Shapwick and Meare Heaths. No detailed stratigraphy of West Sedgemoor has been published and the material reported here relates only to the top 200 cm of peat which is likely to be physically and chemically altered by pump drainage.

PHYSICAL BACKGROUND TO WEST SEDGEMOOR

West Sedgemoor lies in an enclosed basin, underlain by Triassic Keuper marl which forms the North Curry-Stathe ridge to the north west and, together with overlying Rhaetic and Lower Lias shales and limestones, forms the Curry Rival ridge to the south east. The Somerset Levels area was inundated around 6000 BC and a thick layer of blue-grey estuarine clay was deposited. Since then, about 3-4 m of fen peat have formed in West Sedgemoor, with alluvial material overlying the peat around the basin peripheries. Findlay (1965) thus mapped two main soil groups in West Sedgemoor: (i) the Sedgemoor Series in the centre of the moor, of pre-Roman fen peat with high base status due to flooding with base-rich water and (ii) the Midelney Series on the moor peripheries, where, on average, 40 cm of alluvium, derived from the surrounding Keuper marl uplands, overlies the peat. Thus the mineralogy and geochemistry of the Keuper marl, particularly the presence of gypsum layers, are thought to have an important influence on the current chemistry of the peat.

There were two main aims of the study: (i) to characterise the surface stratigraphy of an unmanaged section of West Sedgemoor and (ii) to examine relationship between peat types, classified in the field according to Troels-Smith (1955) and von Post & Granlund (1926) and total peat chemical characteristics determined in the field and laboratory.

MATERIALS AND METHODS

FIELD SITE

A location in the south western part of West Sedgemoor, on land owned by the Royal Society for the Protection of Birds, was chosen for the siting of a peat sampling transcet. This location is not currently drained or fertilized and thus management alteration of the near-surface peat chemistry could be avoided. A transect, 1200 m long, was laid down from the south eastern edge of the moor (ST 364 247) to the middle drain in the centre of the moor (ST 356 255), with peat sampling locations at 100 m intervals. At each location, a 3 cm Eijkelkamp gouge auger was used to sample the peat in an intact core to a depth of 2 m. The stratigraphy was described using the Troels-Smith (1955) classification and the degree of humification was assessed using the von Post 10 point scale (von Post & Granlund, 1926). Peat samples were taken at 25, 50 , 100 and 150 cm depths. At each of these depths, five pH readings were taken directly in the field on fresh material using a WPA portable pH meter. At each 100 m location on the transect, the floristic composition of the current fen meadow was recorded using the nomenclature of Clapham, Tutin and Warburg (1962).

CHEMICAL ANALYSIS

Subsamples of the peat were oven-dried and then ground to pass through a 0.5 mm mesh; 0.1 g portions of this fraction were digested using a modified microkjeldahl technique with concentrated H_2SO_4 and H_2O_2 (Allen *et al.*, 1974) and were subsequently used for the determination of total N, P, K, Na, Ca, Mg and Fe in the peat. N and P in solution were determined using automated versions of the colorimetric techniques of Crooke & Simpson (1971) and Murphy & Riley (1962) respectively. K and Na in solution were determined by flame emission spectrophotometry and Ca, Mg and Fe in solution by atomic absorption spectrophotometry using a Pye Unicam SP9. Total S in the peat was determined directly by X-ray spectrophotometry in the Department of Geology, Bristol University. Loss on ignition (LOI), determined at 450°C for 4 hours, was used as an index of soil organic matter content.

RESULTS

CURRENT VEGETATION

A large variety of *Graminae* species are present in both drained/cut and undrained/uncut meadow (Table 1). While the true water-loving species such as *Typha angustifolia, Carex paniculata, C. acutiformis* and *Phragmites communis* are very common in adjoining ditches, only *Filipendula ulmaria* is common in both meadow and ditch. The major difference between drained/cut meadow at the edge of the moor and undrained/uncut meadow near the moor centre is in dicotyledon richness, with fewer very frequent dicots in the managed grasslands. Of particular note is the incidence towards the centre of the moor of two *Carex* species, *C. acutiformis* and *C. lepidocarpa*, which are both able to withstand neutral to alkaline fen conditions with high base status.

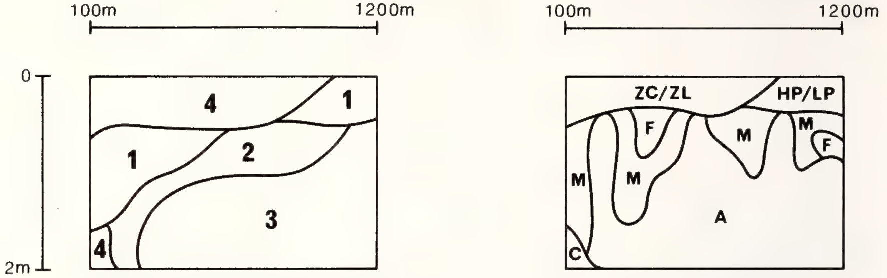
SITE	DESCRIPTION	SPECIES PRESENT	
		Non-Dicot	Dicot
1	Agriculturally managed (drained, uncut meadow) 60-80 cm tall sward	*Phleum pratense* *Deschampsia caespitosa* *Holcus lanatus* *Hordeum vulgare* *Festuca pratensis* *Arrhenatherum elatius* *Alopecurus pratensis* *Dactylis glomerata* *Cynosurus cristatus* *Lolium perenne*	*Achillea millefolium* *Ranunculus repens* *Lotus corniculatus*
2,3, 4,5, 6	Agriculturally managed (drained, cut meadow) 10-20 cm tall sward	*Juncus effusus* *Carex lepidocarpa* *Carex nigra* *Scirpus maritimus* *Holcus lanatus* *Dactylis glomerata* *Phleum pratense* *Agrostis tenuis* *Festuca pratensis* *Festuca rubra* *Anthoxanthum odoratum*	*Rumex acetosa* *Ranunculus acris* *Ranunculus flammula* *Potentilla anserina* *Filipendula ulmaria* *Trifolium repens*
8,9, 10,11, 12	RSPB Reserve (undrained, uncut wet fen meadow)	*Juncus effusus* *Juncus articulatus* *Carex flacca* *Carex nigra* *Acrocladium cuspidatum* *Holcus lanatus* *Agrostis tenuis* *Phleum pratense* *Alopecurus pratensis* *Cynosurus cristatus* *Arrhenatherum elatius* *Anthoxanthum odoratum*	*Plantago lanceolata* *Mentha aquatica* *Ranunculus acris* *Ranunculus flammula* *Filipendula ulmaria* *Succisa pratensis* *Rhinanthus minor* *Hydrocotyle vulgaris* *Thalictrum flavum* *Lychnis flos-cuculi* *Centaurea nigra* *Galium palustre* *Hieracium* sp.

Table 1. Most frequent plant species recorded at sites on the peat sampling transect in West Sedgemoor.

PEAT STRATIGRAPHY

Some physical properties of the peat in West Sedgemoor are illustrated in the simplistic cross sections in Fig. 1. Fig. 1(a) is a simplified classification of the full field Troels-Smith categories which are published elsewhere (Ross & Heathwaite, in press). Based on macrofloral remains, the floristic composition of peat in West Sedgemoor indicates a transition from *Phragmites* dominated, increasingly freshwater estuarine reed swamp to a base-rich sedge fen where *Phragmites* was associated with *Cladium mariscus*. In other parts of the Somerset Levels, this successional stage is radiocarbon dated at 4744 ± 45 b.p. (SRR-882) to 4848 ± 45 b.p. (SRR-883) (Orme, 1982). The further drying out of the West Sedgemoor habitat, particularly around the basin peripheries, led to the development of fenn carr with alder becoming established, at least to a distance of 800 m into the moor. The final stage of development indicates slightly wetter conditions with *Cladium* as dominant, leading to the current vegetation of base-rich meadow, composed of grasses and sedges.

The bulk of peat towards the centre of the moor and below a depth of 1 m is in the form of an amorphous slurry. LOI values (Fig. 1(c)) indicate that these amorphous peats contain ⩾ 60% organic matter, while many of the surface and peripheral peat deposits contain > 50% clay mineral material, possibly of both colluvial and alluvial origin. LOI values of around 70% in the centre of the moor also indicate significant amounts of inorganic materials, presumably washed in alluvially or through marine inundation during peat development. The higher values of C:N ratio in these amorphous peats indicate the poorer degree of decomposition and mineralisation under waterlogged conditions compared to the moor surface and peripheries.

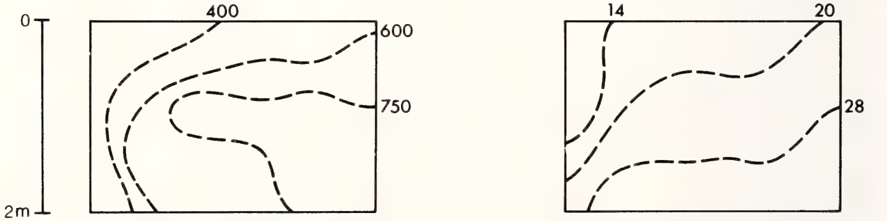


a) Field -derived categorical divisions

1 : Loamy Peat/Humose Peat
2 : Sedge Peat, >60% *Cladium* Remains
3 : Mixed Peat Remains, Predominantly *Cladium*, *Phragmites* and *Alder*
4 : Silty Clay/Silty Loam

b) Von Post degree of humification

ZC/ZL : Silty Clay/Silty Loam
C : Clay
HP/LP : Humose Peat/Loamy Peat
F : Fibrous Peat, Von Post H1-H3
M : Mesofibrous Peat, Von Post H4-H6
A : Amorphous Peat, Von Post H6-H10



c) Loss on ignition mg g^{-1}

d) Carbon-Nitrogen ratio

Figure 1. Schematic Cross Sections of West Sedgemoor, illustrating peat humification and organic characteristics.

PEAT CHEMISTRY

The *in situ* peat pH values ranged from 6.0 to 6.5 with little variation between categories. This confirms the view of West Sedgemoor as a neutral, fen habitat.

As expected, total amounts of Fe, Mg, K and P in the peat are highest in deposits at the surface and peripheries of West Sedgemoor which contain the most inorganic mineral material (Fig. 2). Since the peat itself is the most important source of nitrogen in the moor, it would be expected that highest levels of N would be found in deposits with highest organic matter content. This is only partly true in West Sedgemoor, where peat in the peripheries of the moor, high in inorganic mineral material, do show the lowest amounts of total N.

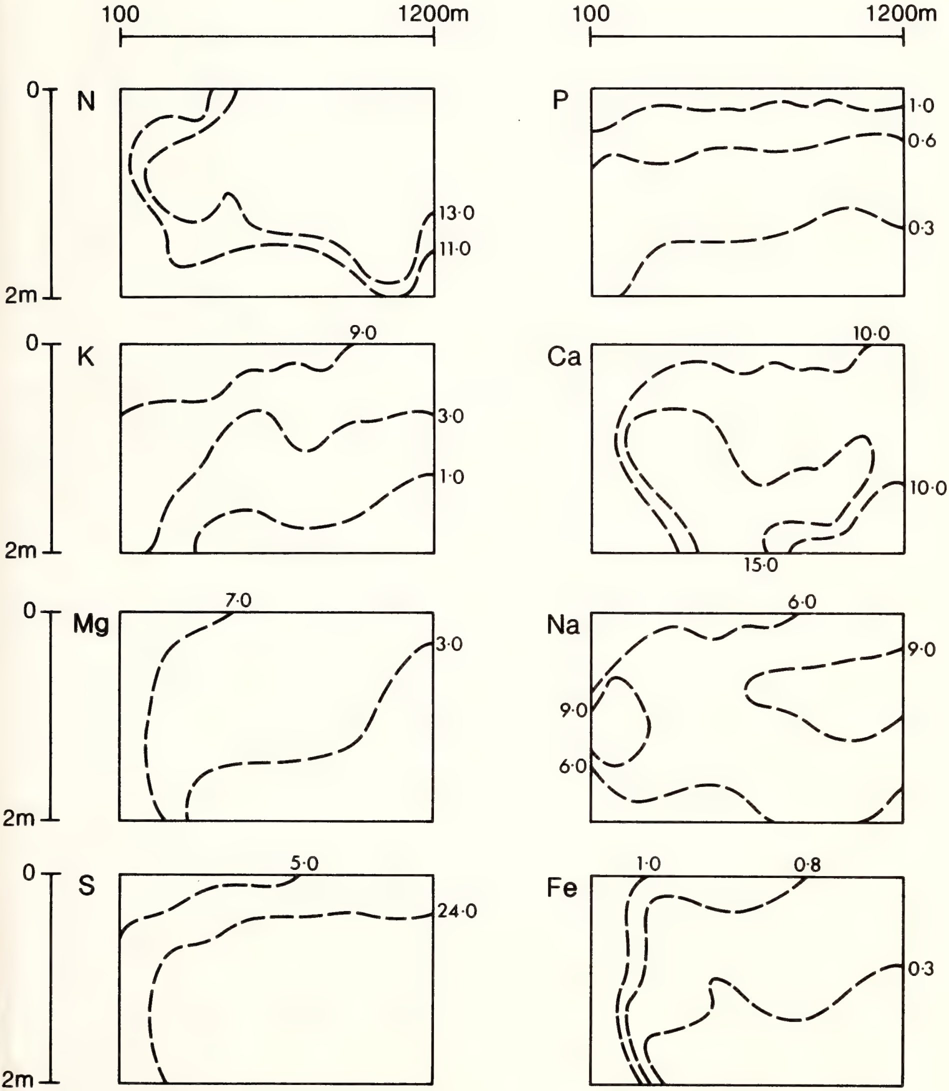


Figure 2. Schematic Cross Sections of West Sedgemoor, illustrating Total Peat Content of N, P, K, Ca, Mg, Na, S and Fe. (All isopleths calibrated in mg g^{-1}).

The distribution of total sulphur (Fig. 2) suggests that the organic matter is the main *in situ* source of S, with less present in inorganic, mineral form. Interestingly, peat water extracts indicated that soluble sulphates also increase with distance and depth into the moor. This may illustrate a movement of S into the moor with accumulation during peat development. Distributions of Ca and Na in Fig. 2 show a more varied pattern and may be due to alluvial and marine incursions respectively.

DISCUSSION

The main control on total peat chemistry in West Sedgemoor appears to be the amount of mineral clay material present in the deposits. The peat types of different floristic composition and humification do not obviously divide up into characteristic chemical types. One might expect nutritional differences with ecological change and anticipate higher levels of chemical elements in sediments with greater floristic diversity. The opposite is true in West Sedgemoor deposits. *Cladium* dominated sediments contain higher levels of P, K, Mg and Fe with lower C:N ratios, indicating a more advanced degree of mineralisation than in sediments also containing *Alnus* and *Phragmites*. It is possible that the *Cladium* deposit was originally more species diverse but that other remains, eg. some *Carex* species, are no longer identifiable. An equally likely explanation of the results is that the current peat chemistry in West Sedgemoor is more a function of depth and current water management practices than it is of floristic composition; the *Cladium* deposits nearer the moor surface being influenced by mineral inputs to the moor in surface run-off and sediments during flooding. Thus the two major controls on water table fluctuations: (i) seasonal variations in precipitation inputs and (ii) agricultural pump drainage schemes, act to redistribute soluble and particulate nutrients in the top 1-2m of the peat.

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LICHEN ECOLOGY ON STEEP HOLM

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INTRODUCTION

The lichens of Steep Holm have received very little attention which is surprising in view of its accessibility and the attraction which island floras hold for many botanists. The only records traced are those of Mclean and Hyde (1924) who spent a day collecting all plant groups in June 1923. The Taunton botanist W. Watson identified 22 lichens from their gatherings; some of these, together with 4 additional records, can be found in his personal annotated copy of "The Lichens of Somerset" (Watson, 1930). In April 1980 I spent a week on Steep Holm most of which was devoted to lichenology. The island list now stands at 96 species (Somerset Archaeological and Natural History Society, 1981); few are rare but the ecology of the lichen flora is particularly unusual and forms the main subject of this account. Background information on the history and natural history of the island can be found in multi-author volumes edited by Kenneth Allsop Trust and John Fowles (1978) and Somerset Archaeological and Natural History Society (1981).

THE LICHEN COMMUNITIES

LIMESTONE

Exposed, well-lit, dry limestone is normally covered by a dense mosaic of crustose lichens many of which have their thallus embedded in the rock, it has been named the *Aspicilion calcareae* alliance after the dominant species (James *et al.*, 1977). On Steep Holm this community of strict calcicoles is rare having mostly been replaced by a more general flora in which larger, coarser, more superficially attached species such as *Candelariella medians, Lecania erysibe, Phaeophyscia orbicularis, Physcia adscendens, Rinodina gennarii, Verrucaria viridula* and *Xanthoria parietina* dominate. These species are all tolerant of the heavy gull manuring which every rock outcrop is subjected to. Eutrophication caused by guano is the major factor controlling the lichens of the limestone so the flora of the island, on a giant scale, resembles that of a limestone gravestone used as a bird perch. The huge population of the yellow, rosette forming lichen *Candelariella medians* is of interest as this species has an urban tendency and is rarely found in such a natural habitat, it is probably more abundant on Steep Holm than anywhere else in Britain.

The normally universal *Aspicilion calcareae* alliance is restricted to those vertical limestone faces which experience reduced eutrophication. Here *Aspicilia calcarea, Caloplaca aurantia, C. saxicola, Lecanora crenulata, Placynthium nigrum* and immersed pyrenocarpus lichens can be found. This community is best developed on the sheer cliff covered with wallflowers behind the Inn. It was thoroughly explored and found to be the only locality on the island for *Agonimia tristicula, Catapyrenium lachneum* and *Solenopsora candicans* which probably represent the last traces of a formerly widespread cliff-ledge community. This site also yielded a lichen taxon new to science (see later).

Two other microhabitats also escape the worst of the eutrophication. Slightly shaded, dry, north facing overhangs are frequently colonised by *Diploica canescens, Diplotomma alboatrum, Dirina repanda* and *Opegrapha chevallieri*, an association of lichens which all have chalky white thalli and Mediterranean affinities. Low, shaded, damp limestone outcrops in the sycamore wood are the headquarters of shelter demanding species such as *Acrocordia conoidea, Caloplaca cirrochroa, Opegrapha conferta* and *Porina linearis,* all of which will have spread since the wood grew up.

The major features of the limestone flora is the shift in its composition caused by gull manuring. This has resulted in the specialised low nutrient demanding, calcicolous flora being replaced by nitro-tolerant species with a wide ecological amplitude. In places hypertrophication is so severe that species substitution has led to the ingress of green algae such as *Prasiola stipitata.* Records made in 1923 together with the survival of relics of the former calcicolous assemblages suggest this replacement is a fairly recent phenomenon and started with the sharp increase in gull numbers which commenced about 1930.

WOODLAND AND SCRUB

Twenty-three lichens occur on trees and bushes, a number which can be expected to increase as the sycamore wood ages. Most are common species of nutrient enriched bark (and rock) being found throughout the British Isles. Large old elders support a fine development of the spectacular *Xanthorion parietinae* alliance (James *et al.,* 1977) in which the leading species are *Buellia punctata, Lecidella elaeochroma, Phaeophyscia orbicularis, Physcia adscendens, Physconia grisea, Xanthoria parietina* and *X. polycarpa,* with *Physcia dubia* and *Physciopsis adglutinata* less frequent. Upper branches exposed to the wind carry occasional thalli of *Ramalina fastigiata.*

Epiphytes with a restricted distribution on the island are mostly species intolerant of eutrophication, these are concentrated in the sycamore wood the canopy of which intercepts much guano. A complete list was made from the sycamore trunks to form a base line against which the further development of their epiphytic flora could be gauged. Many trunks are completely bare but sparsely present throughout the wood are *Cliostomum griffithii, Lecanora carpinea, L. expallens, L. pulicaris, Lecidella elaeochroma* and *Parmelia sulcata* (1 small thallus) with *Buellia punctata* occasional. On elder at the north end of the wood *Bacidia laurocerasi* and *Parmelia caperata* were unexpectedly good finds.

The dense privet in the Priory area is distinctive for having a slightly more acidic bark than either elder or sycamore, consequently it carries fairly large amounts of *Parmelia glabratula, P. subrudecta* and *P. sulcata;* it does not appear to be sufficiently acid to support *Hypogymnia physodes.* No evidence of air pollution affecting the epiphytic lichens was noted, the pollution tolerant species *Lecanora conizaeoides* which is widespread throughout South Wales was only occasionally seen, always on privet, though this may partly be due to an intolerance of eutrophication.

MARITIME ZONE

Though certain features of the lichen zonation on limestone shores are known (Fletcher, 1975) no published accounts have been traced so a full description is given in Table 1. The littoral or 'Black Zone' which extends from near low water mark to a little above high tide mark is normally dominated by species of maritime *Verrucaria* with black thalli. On Steep Holm, *Arthopyrenia halodytes, Verrucaria ditmarsica* and *V. mucosa* are locally present in crevices and hollows but never form the continuous black cover which is typical of intertidal rocks on siliceous shores; their fullest development is on mineral veins in the vicinity of Five John's Cave. Higher up the shore this assemblage is largely replaced by the 'Tar-spot lichen', *Verrucaria maura.*

Above the influence of tides (but not spray) *Lecanora helicopis* and *Caloplaca marina* form a discontinuous belt being joined slightly higher up by other 'Orange Zone' species such as *Caloplaca heppiana*, *C. thallincola* and *Xanthoria aureola*. Instead of grading into the rich 'Grey Zone' of siliceous shores the 'Orange Zone' passes rapidly into the normal limestone lichen flora of the island. The only 'Grey Zone' lichen encountered was *Ramalina siliquosa* on an acidic outcrop of vein minerals near the top of the 208 steps.

The limestone shores of Steep Holm then, carry an impoverished, truncated zonation in which only 7 of the 70 or so exclusively maritime lichens found in Britain play a part. Why simple, species-poor assemblages should be typical of maritime limestone is not known but on Steep Holm where they are particularly poor, an intolerance of guano and the murky waters of the Bristol Channel which coat many apparently suitable surfaces with mud may be contributory factors. It is noteworthy that the maritime lichen flora reaches its most complete development in acid microhabitats such as mineral veins.

BUILDINGS

Being constructed mostly of concrete, buildings carry a lichen flora similar to but poorer than that of the limestone. At two sites however architectural features and building materials combine to provide niches of some interest. The cave-like entrance to the underground shell stores of Laboratory and Tombstone Batteries support dense sheets of the rare *Bacidia arnoldiana*, a green, shelter-demanding species with pink fruits. A retaining wall faced with lime-mortar at the entrance to the shell store serving Tombstone Battery is also the only site on the island where the normally widespread calcicole species *Protoblastenia rupestris* and *Toninia aromatica* occur. The two-storey barracks building, constructed of granite and sandstone, provides both the most exposed and the most acidic habitat on the island. The vertical granite faces support occasional small colonies of *Ramalina fastigiata* and *R. subfarinacea* where they can catch the salt-laden breeze; while granite on the north side of the building supports *Psilolechia lucida*, the only truly calcifuge species on the island.

'Black Zone', Littoral		
	Lower	*Arthopyrenia halodytes*, *Verrucaria ditmarsica*, *V. muscosa*
	Middle	More or less devoid of lichens
	Upper	*Verrucaria maura*
'Orange Zone', Mesic-supralittoral		
	Lower	*Caloplaca marina*, *Lecanora helicopis*
	Middle	*Caloplaca heppiana*, *C. thallincola*, *Lecanora dispersa*, *Rinodina gennarii*, *Xanthoria aureola*
	Upper	Normal lichen flora of eutrophicated limestone dominated by *Candelariella medians* and *Phaeophyscia orbicularis*
'Grey Zone', Submesic and Xeric-supralittoral		
	Occupied by many terrestrial halophobic species	

Table 1. Lichen Zonation on South-facing Limestone Shore, near Calf Rock.

IRON CANNONS

Lichens grow on iron only when conditions are specially favourable which they must be on Steep Holm as nine species occur on the pitted surfaces of the old cannon. Most are also found in other habitats on the island but *Candelariella vitellina* is restricted to the guns of Split Rock Battery. The literature on iron as a lichen substrate has been the suject of a review by Brightman & Seaward (1977) from which it can be seen that the Steep Holm species are already known to be iron tolerant. The cannon at Summit and Laboratory Batteries support the best growth which includes sheets of *Lecanora dispersa* and three foliose species.

A LICHEN TAXON NEW TO BRITAIN

While exploring the steep limestone cliff behind the ruined Inn a strikingly beautiful citrine-green form of the normally orange-yellow coloured lichen *Candelariella medians* was discovered. About 50 colonies were present in a small area surrounded by a huge population of the ordinary colour form. Members of the genus *Candelariella* are typically orange-yellow but two citrine-green species have been described from Germany and the discovery of a third on Steep Holm led to a reappraisal of this character. A detailed anatomical, morphological and chemical investigation of the Steep Holm pair showed that they differed solely in the suppression (in the green one) of the reddish coloured lichen acid calycin. This was also confirmed as the only difference between the other species which also have orange-yellow counterparts. As a result, the citrine-green entities have been reduced to chemotypes with the status of forms. The new one has been designated *Candelariella medians* f. *steepholmensis* with the island as its type locality (Gilbert, Henderson & James, 1981).

DISCUSSION

The lichen flora of Steep Holm is not large nor does it contain many rarities. The total of 96 species, 11 of which appear to be extinct, is probably still declining under the influence of sea bird manuring which has simplified the communities and caused a convergence of habitat conditions. This eutrophication favours the development of the *Xanthorion parietinae* alliance which now clothes most rocks, trees and buildings. Due to increased fertility of the normally unproductive shallow limestone soils these once-rich cryptogamic sites now carry a lush vegetation of tall herbs and scrub which it is impossible for terricolous lichens to penetrate. By contrast, the south-facing slopes of Brean Down which are unaffected by gulls and mostly free of scrub support lichen vegetation of national importance (Gilbert, 1978).

Using the 26 records made during the 'farming period' (1910-25) as a guide, it is possible to reconstruct some of the communities which may have occupied the island prior to the sharp rise in gull numbers. Records of abundant terricolous (Ground dwelling) species such as *Cladonia furcata, C. pocillum* and *C. rangiformis* suggest that earlier this century cliff tops and ledges carried a close-cropped, lichen-rich grassland similar to that on Brean Down. The lichen flora of rock surfaces has also changed from being dominated by strict calcicoles such as *Caloplaca ochracea, C. variabilis* and *Protoblastenia calva* to one where nitro-tolerant species like *Candelariella medians* and *Phaeophyscia orbicularis* - neither recorded in 1923 - predominate. The long list of extinct bryophytes and flowering plants also point to far-reaching ecological changes this century.

Currently the main lichen interest of Steep Holm is that it provides an example of a lichen flora controlled by gulls. In places the hypertrophication is so severe that species substitution in the lichen communities has led to a domination by green algae or bare rock and bark.

Blowing fertiliser dust has had the same effect in certain agricultural areas of lowland Britain. Variation in the lichen flora is provided by sites where eutrophication is reduced such as on vertical cliffs, below rock overhangs and in the sycamore wood.

The position of the island on the west coast of Britain is not conspicuously reflected in the composition of its lichen flora which contains many phytogeographical elements, it is possible however that the atlantic climate is responsible for the large number of Collemataceae which have been recorded though unfortunately the rarest ones *Collema fragile* and *Leptogium cretaceum* are not supported by herbarium material. Voucher material of all critical species found in 1980 has been deposited in the Woodspring Museum at Weston-super-Mare, though some of the more notable specimens reside in the herbaria of the British Museum, London and Royal Botanic Garden, Edinburgh.

THE FLORA

Nomenclature follows Hawksworth, James and Coppins (1980). An asterisk denotes species not refound during the current survey conducted 19 - 26 April 1980.

Acrocordia conoidea (Fr.) Körber	Occasional, sheltered limestone.
Agonimia tristicula (Nyl.) Zahlbr.	Very rare, on moss, cliff behind Inn.
Arthopyrenia halodytes (Nyl.) Arnold	Frequent on the lower shore.
Aspicilia calcarea (L.) Mudd	Common on rocks and buildings if not excessively eutrophicated.
Bacidia arnoldiana Körber	Rare, sheltered limestone walls at entrance to underground shell stores.
B. laurocerasi (Delise ex Duby) Zahlbr.	On one elder near Cliff Cottage.
* *B. muscorum* (Ach.) Mudd	Mclean and Hyde, 1923.
B. naegelii (Hepp) Zahlbr.	Overlooked, twigs of privet and elder.
B. sabuletorum (Schreber) Lettau	Sparingly on moss in the quarry behind Summit Battery.
Buellia punctata (Hoffm.) Massal.	Common, on rocks, trees, buildings.
Caloplaca aurantia (Pers.) Hellbom.	Occasional, on vertical limestone.
C. cirrochroa (Ach.) Th. Fr.	Rare, shaded outcropping limestone in the sycamore wood.
C. citrina (Hoffm.) Th. Fr.	Common, on rocks and buildings.
* *C. festiva* (Ach.) Zwackh.	Mclean and Hyde, 1923; doubtful.
C. flavovirescens (Wulfen) Dalla Torre & Sarnth.	Occasional, mostly on buildings.
C. heppiana (Müll. Arg.) Zahlbr.	Abundant on rocks and buildings.
C. holocarpa (Hoffm.) Wade	Occasional, on rocks and buildings.
C. marina (Wedd.) Zahlbr.	Abundant, in a narrow zone above high water mark.
* *C. ochracea* (Schaerer) Flagey.	Mclean and Hyde, 1923.
C. saxicola (Hoffm.) Nordin.	Frequent, particularly on dry, well-lit surfaces.
C. thallincola (Wedd.) Du Rietz	Rare, in the supralittoral zone.
* *C. variabilis* (Pers.) Müll. Arg.	Steepholm, (Watson, 1930).
Candelariella aurella (Hoffm.) Zahlbr.	Common, particularly on buildings.
C. medians (Nyl.) A.L. Sm.	Abundant and widespread on

	eutrophicated surfaces.
C. medians f. *steepholmensis* O.L. Gilbert	Very rare, eutrophicated limestone, cliff behind the Inn.
C. vitellina (Hoffm.) Müll. Arg.	Only on the cannons at Split Rock Battery.
Catapyrenium lachneum (Ach.) R. Sant.	Very rare, in crevices, cliff behind the Inn.
Catillaria chalybeia (Borrer) Massal.	Rare, stonework of Split Rock Battery and sandstone coin of Barracks.
C. lenticularis (Ach.) Th. Fr.	Frequent on rocks and buildings.
* *Cladonia furcata* (Huds.) Schrader	Mclean and Hyde, 1923.
C. pocillum (Ach.) O.-J. Rich.	Very rare, on moss, cliff behind the Inn. Mclean and Hyde recorded this species as abundant in 1923.
* *C. pyxidata* (L.) Hoffm.	Abundant, Mclean and Hyde, 1923.
* *C. rangiformis* Hoffm.	Abundant, Mclean and Hyde, 1923.
Cliostomum griffithii (Sm.) Coppins	Rare, on a few trunks in the sycamore wood.
Collema auriculatum Hoffm.	Sparingly on damp limestone at the base of the Barracks building and on the cliff behind it.
C. crispum (Huds.) Wigg.	Frequent on cliffs and buildings.
* *C. fragile* Taylor	Annotation 'Steepholm' in Watson (1930).
C. tenax (Swartz) Ach.	Occasional on soil.
Diploicia canescens (Dickson) Massal.	Frequent on sheltered, overhanging to vertical limestone.
Diplotomma alboatrum (Hoffm.) Flotow	Frequent on sheltered, overhanging to vertical limestone.
Dirinia repanda (Fr.) Nyl. f. *stenhammarii* (Fr. ex Stenhammar) Clauz & Roux	Frequent on sheltered, overhanging to vertical limestone.
Lecania erysibe (Ach.) Mudd	Abundant on rocks and buildings.
Lecanora albescens (Hoffm.) Branth & Rostrup	Abundant on rocks and buildings.
L. atra (Huds.) Ach.	Occasional, on buildings.
L. campestris (Schaerer) Hue	Occasional, mostly on buildings.
L. carpinea (L.) Vainio	Rare, on a few sycamore trunks.
L. conizaeoides Nyl. ex Crombie	Rare, on privet near Priory ruins.
L. crenulata (Dickson) Hook.	Occasional on vertical limestone.
L. dispersa (Pers.) Sommerf.	Ubiquitous.
L. expallens Ach.	Rare, on a few sycamore trees.
L. helicopis (Wahlenb. ex Ach.) Ach.	Abundant, at and someway above high water mark.
L. pulicaris (Pers.) Ach.	Rare, on a few sycamore trunks.
Lecidella elaeochroma (Ach.) Choisy	Frequent on elder, privet and sycamore.
L. stigmatea (Ach.) Hertel & Leuckert	Frequent on buildings, rarer on rocks.
Lepraria incana (L.) Ach.	Occasional on sheltered soil, bark and stone.
Lepraria sp. (undescribed green species)	Rare, very sheltered limestone.
* *Leptogium cretaceum* (Sm.) Nyl.	Annotation 'Steep Holm' in Watson (1930).

L. plicatile (Ach.) Leighton	Rare, on damp limestone cliff behind the Barracks.
Opegrapha chevallieri Leighton	Occasional, on vertical limestone protected from eutrophication.
O. conferta Anzi	Occasional, shaded limestone in the sycamore wood.
Parmelia caperata (L.) Ach.	On one elder near Cliff Cottage.
P. glabratula (Lamy) Nyl.	Rare, on privet, once on elder.
P. subrudecta Nyl.	Occasional, on privet and elder.
P. sulcata Taylor	Occasional, on privet and elder, once on sycamore.
Phaeophyscia orbicularis (Necker) Moberg	Ubiquitous.
Physcia adscendens (Fr.) H. Olivier	Ubiquitous.
P. caesia (Hoffm.) Fürnrohr	Frequent on buildings, rare on cliffs.
P. dubia (Hoffm.) Lettau	Rare on elder.
P. tenella (Scop.) DC.	Ubiquitous.
Physciopsis adglutinata (Flörke) Choisey	On one elder by Garden Battery.
Physconia grisea (Lam.) Poelt	Occasional on large elders, well established on the Barracks.
* *P. pulverulenta* Moberg	Mclean and Hyde, 1923; possibly mistaken for the previous species.
Placynthium nigrum (Huds.) Gray	Occasional in damp niches on the cliffs.
Porina linearis (Leighton) Zahlbr.	Rare, on sheltered limestone.
* *Protoblastenia calva* (Dickson) Zahlbr.	Abundant, Mclean and Hyde, 1923.
P. rupestris (Scop.) Steiner	Very rare, on lime mortar, Tombstone Battery.
Psilolechia lucida (Ach.) M. Choisy	North-facing granite wall of Barracks.
Ramalina farinacea (L.) Ach.	Rare, isolated thalli on shrubs.
R. fastigiata (Pers.) Ach.	Rare, isolated thalli on elder twigs and granite walls of the Barracks.
R. siliquosa (Huds.) A.L. Sm.	One patch on outcropping mineral vein near top, and slightly east of the 208 steps.
R. subfarinacea (Nyl. ex Crombie) Nyl.	Rare, high up on the Barracks.
Rinodina gennarii Bagl.	Common on eutrophicated limestone and buildings.
Solenopsora candicans (Dickson) Steiner	Very rare, limestone cliff behind the Inn.
Thelidium decipiens (Nyl.) Krempelh.	Occasional, sheltered vertical limestone.
T. incavatum Nyl. ex Mudd	Frequent, sheltered near vertical limestone.
Toninia aromatica (Turner ex Sm.) Massal.	Very rare, crevices in stonework of underground shell store, Tombstone Battery.
Verrucaria baldensis Massal.	Frequent, sheltered near vertical limestone.
V. ditmarsica Erichsen	Frequent, on the lower shore.
V. glaucina Ach.	Occasional on buildings, rare on limestone.

V. hochstetteri Fr.	Frequent on rocks and buildings.
V. maura Wahlenb.	Abundant, in the upper littoral zone.
V. muscosa Wahlenb.	Frequent, on the lower shore.
V. muralis Ach.	Frequent, on buildings and rocks.
V. nigrescens Pers.	Common, on rocks and buildings.
V. viridula (Schrader) Ach.	Common, on rocks and buildings.
Xanthoria aureola auct.	Ubiquitous.
X. parietina (L.) Th. Fr.	Ubiquitous.
X. polycarpa (Hoffm.) Rieber	Frequent, a twig epiphyte.
*(*Toninia mesoidea* (Nyl.) Zahlbr.	Mclean and Hyde, 1923; probable error).

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THE GENUS *FUMARIA* IN AVON

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INTRODUCTION

Seven of the ten species of *Fumaria* occurring in Britain have been recorded in Avon. *Fumaria* is a taxonomically difficult genus comprising c. 60 species distributed mainly in Europe and the Mediterranean region (Clapham, Tutin & Warburg, 1962). According to Riddlesdell *et al.* it is frequently regarded as possessing a status below that of native in Britain, with perhaps the exception of *F. officinalis*, seeds of which have been found in Neolithic remains. This is unlikely, however, for as Riddlesdell goes on to point out, the fact that Pugsley (1912) has described several taxa endemic to the British Isles, *viz. F. purpurea, F. capreolata* ssp. *babingtonii* and **F. occidentalis*, suggests that they may well have been with us for a very long time.

It is difficult to determine the natural habitat of *Fumaria* species for they are now usually restricted to man-made habitats, growing on walls, in hedge bottoms or as weeds of cultivation. They are plants of disturbed, open habitats and, in common with many successful weeds, show great phenotypic plasticity in the face of environmental variation. As many authors have pointed out (e.g. Pugsley, 1912; Daker, 1964) specimens growing in shade or on unsuitable soil frequently produce abnormally small, chlorophyllous flowers which are useless for the purpose of identification: in such circumstances, however, as Pugsley (1912) points out, the sepals and mature fruits often remain true to type. These small flowers are cleistogamous and automatically self-pollinate (indeed many chasmogamous *Fumaria* flowers self before anthesis) giving rise to fertile seeds. Being self-fertile, *Fumaria* species are habitual inbreeders (Daker, 1964) and some populations arise from only one or two individuals. This accounts, in some part, for the variation patterns observed but this will be discussed in greater detail elsewhere.

MORPHOLOGY

The fumitories may be divided into large-flowered and small-flowered species. These are represented by Pugsley's (1912) sections *Grandiflorae* and *Parviflorae* respectively. The large-flowered British species of the former are divided into subsections *Agrariae* (*F. occidentalis* Pugsley), *Capreolatae* (*F. capreolata* L. and *F. purpurea* Pugsley) and *Mediae* (*F. martinii* Clavaud, *F. muralis* Sond. ex Koch and *F. bastardii* Bor.). British members of the *Parviflorae* (or *Fumaria* Sell) include *F. densiflora* DC., *F. officinalis* L., *F. parviflora* Lam. and *F. vaillantii* Lois. The latter two species Pugsley (1912) classified in subsection *Microsepalae*: they will not be discussed here. *F. densiflora* is the sole British representative of subsection *Latisepalae* while *F. officinalis* is placed by Pugsley in the *Officinales*. As one would expect, the species in each subsection are morphometrically more similar to each other than to any of the species from the other subsections. Thus the species are best discussed in the groups in which confusion may arise and the Avon taxa are examined in such an order below, considering first the large-flowered species.

**F. occidentalis* may have an affinity to the Lusitanian *F. agraria* Lag. as indicated by similarities in periderm morphology.

SECTION *GRANDIFLORAE*

Subsection *Capreolatae* is represented in Avon by *F. capreolata* ssp. *babingtonii* (Pugsley) P.D. Sell and *F. purpurea*. These two fumitories are morphologically very similar to one another and are easily confused. They are both characterised by their recurved fruiting pedicels. This serves to distinguish Pugsley's subsection *Capreolatae* from the other two species of this section discussed here. The two are most easily distinguished when in flower. The wings of the upper petal of *F. purpurea* exceed its keel when folded upwards whereas those of *F. capreolata* become progressively narrower towards the corolla tip such that the keel cannot be obscured. This difference in size of the upper petal wings results in the flowers of the two species having noticeably different outlines when viewed from the side, that of *F. purpurea* being sub-rectangular compared with that of *F. capreolata* which tends to be cuneiform with the tip forming the narrow end. These features are stressed in Figures 1 and 2. Smith (1984) has observed some specimens of *F. capreolata* in Cornwall which appear intermediate between these two species in certain features. The corollas are tinted with pink as in *F. purpurea* but unlike *F. capreolata* which normally has

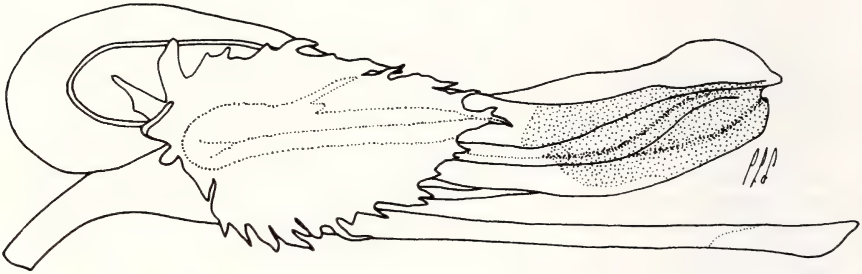


Figure 1. *Fumaria capreolata* - floral morphology.

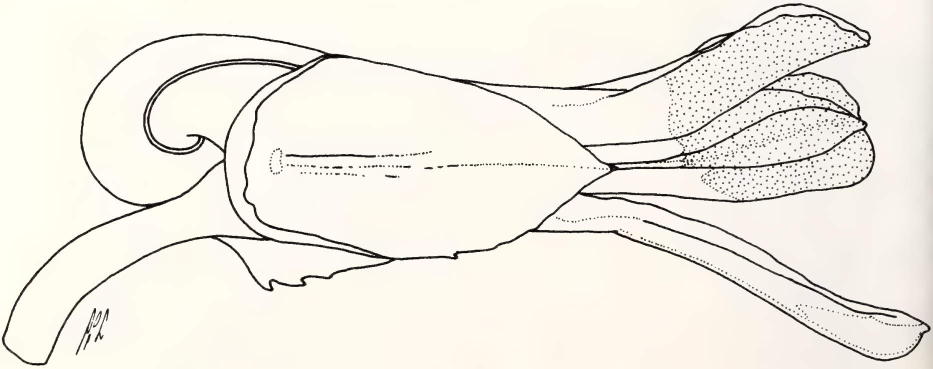


Figure 2. *Fumaria purpurea* - floral morphology.

pure white flowers except for the dark tips, and the upper petal wings are more highly developed than usual. It was considered that these might represent what Pugsley regarded as subvariety *divaricata* of his variety *babingtonii*. Following Sell's elevation of this endemic British variety to subspecific rank, these should now be designated as *F. capreolata* ssp. *babingtonii* var. *divaricata* (Stafleu, I.C.B.N. 1983). *F. capreolata* ssp. *babingtonii* is thought to be endemic to the British Isles (Pugsley, 1912).

The fruits of *F. capreolata* and *F. purpurea* are very similar in outline (see Figure 4). Those of the former being sub-rotund as described by Pugsley (1912) with an obtuse apex. The base shows a poorly developed peridermal collar or neck. The fruits of *F. purpurea* tend to be slightly bigger than those of *F. capreolata*, being of a similar shape but wider and with a rounded, truncate apex and a clearly developed basal neck. The periderm (fruit coat) of *F. capreolata* is usually smooth whereas that of *F. purpurea* is often minutely rough (sub-rugulose). However, these two latter characters, being somewhat subjective, are not always completely reliable.

Pugsley's subsection *Mediae* (*Murales* of Haussknecht, 1873) is represented in Britain by *F. bastardii*, *F. muralis* ssp. *boraei* (Jordan) Pugsley and *F. martinii*. All three species have been recorded from the area now known as Avon and, considering the vicarious nature of germination of fumitory seeds (Smith, 1984), they might be expected to occur again. *F. bastardii* and *F. muralis*, the commonest of the three, may be confused as they are morphometrically very similar to one another. The situation is further complicated by the existence of var. *hibernica* of *F. bastardii* and var. *ambigua* of *F. muralis* ssp. *boraei*. These two facies were originally described by Pugsley (1912) and each variety shows characteristics of both species (Smith, 1984).

Typically, flowers of *F. bastardii* lack the dark red tip to the upper petal seen in all other British fumitories. In *F. bastardii* this petal is uniformly pink whereas in *F. muralis* ssp. *boraei* it has a dark red tip and wings contrasting against a paler background. Care must be taken, however, to distinguish between the upper petals and the laterals, as the latter have dark red tips in normal flowers of all British species. *F. bastardii* var. *hibernica* has upper petals with dark red tips like those of *F. muralis* and therefore this character is not definitive when used alone. A further useful character to examine is the number of flowers per raceme. *F. bastardii* tends to show 15 or more whereas typical *F. muralis* shows about 12. *F. bastardii* var. *hibernica* again complicates the situation by often having between 12 and 15.

Fruit characters are the most reliable in this case, the British varieties of *F. bastardii* having rugose periderms while the fruits of *F. muralis* vary from smooth to rugulose. The difficulty for the beginner is in assessing the difference between smooth, rugulose and rugose. Generally, however, among the British taxa in this sub-section a smooth fruit is characteristic of *F. muralis* and a rough fruit of *F. bastardii*. *F. muralis* ssp. *boraei* var. *ambigua* like *F. bastardii* var. *hibernica* shows rugulose fruits. The fruit base is a useful character for distinguishing between most forms of *F. muralis* and *F. bastardii*. Daker has provided illustration of this in Wigginton & Graham (1981) and the essential difference is shown in Figure 4. of this paper. Basically, the fruits of *F. muralis* have a much narrower base in relation to the fruit width than those of *F. bastardii*, those of the latter appearing truncate. Pugsley (1912) described the fruits of *F. bastardii* as hardly narrowed below to an obscure but broad fleshy neck which, when fresh, equals or even overlaps the tip of the pedicel. *Fumaria* fruits are, however, best examined in the dry state, as they change in outline and surface ornamentation considerably as the periderm dehydrates. *F. bastardii* var. *hibernica* sometimes shows a slightly narrower fruit neck in proportion to fruit width than typical *F. bastardii* but is still distinct from *F. muralis*. *F. muralis* ssp. *boraei* var. *ambigua* sometimes shows a slightly wider neck than the typical form of ssp. *boraei* and, when this is seen in conjunction with a rugulose periderm, confusion may arise. On balance, a rugose periderm and a comparatively broad, truncate fruit base is indicative of *F. bastardii* whereas a smooth periderm and comparatively narrow basal neck is indicative of *F. muralis*. When considered in relation to the floral characteristics discussed above, a large proportion of these facies may be assigned to the correct taxon. Pugsley (1912) also described other subspecific taxa of the British species in subsection *Mediae* and the serious student should refer to his descriptions of these.

F. martinii is a rare species in Britain although it also occurs in W. France and Spain (Clapham, Tutin & Warburg, 1962). Soler (1983) has reduced it to a subspecies of *F. reuteri* Boiss. but this account follows Sell's (1964) nomenclature in *Flora Europaea I* in this respect. *F. martinii* has been recorded from Gilly Tresamble in W. Cornwall where it still occurred in the spring of 1984, a few scattered localities in the Southern Counties and in the vicinity of Claverton Down near Bath. Though very similar to the closely allied *F. muralis* (both were placed in Series *Eu-murales* of subsection *Murales* by Pugsley in 1919), principal components analysis has shown it to be quite distinct when many morphological characters are examined together (Smith, 1984). It may usually be distinguished from *F. muralis* and *F. bastardii* by its longer corollas which exceed 11 mm (sometimes up to 13 mm - see Pugsley, 1912; Daker, 1964), those of the other two species are seldom as long, and by having a greater number of flowers per inflorescence, 18 or more, though sometimes less than 12, (Daker, 1964). The fruits have a rugulose periderm and a sub-rotund profile with an obtuse, truncate apex and a rounded base with virtually no neck. Thus, though rugulose, they should not be confused with the fruits of *F. bastardii*. *F. martinii* also has the dark red tip to the upper petal which is lacking in typical *F. bastardii*.

SECTION *FUMARIA* (*PARVIFLORAE*)

Of all British fumitories *F. densiflora* is morphometrically the most closely allied to *F. officinalis* (Smith, 1984). However, an examination of the salient morphological characters shows that it is easily separated from all other species likely to be encountered in the British Isles. No other

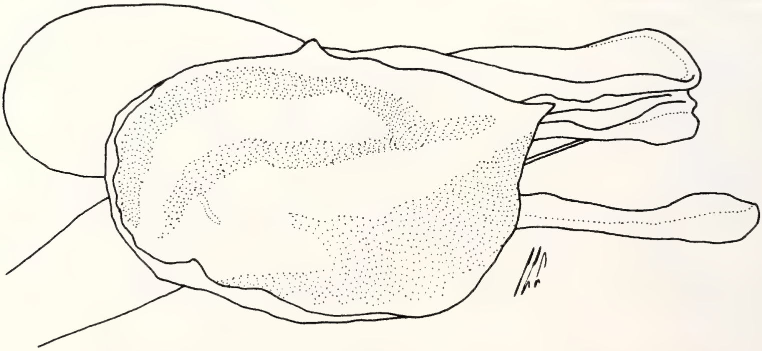
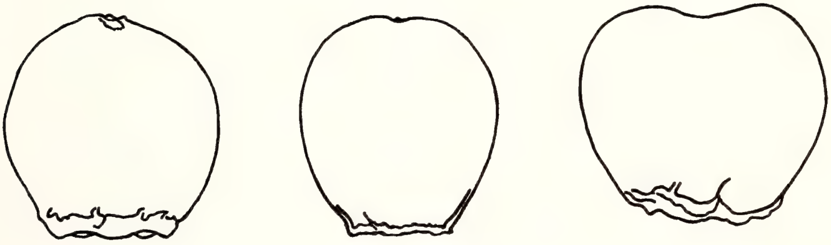


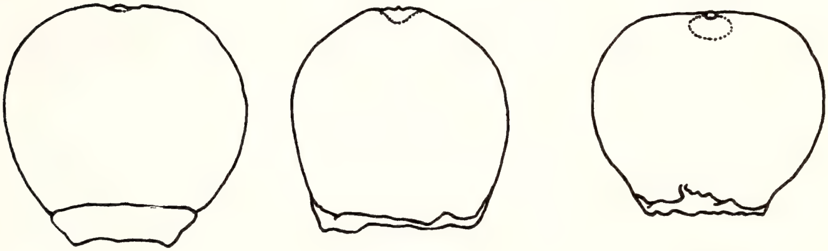
Figure 3. *Fumaria densiflora* - floral morphology.

British fumitory with a corolla as short as *F. densiflora* has sepals as wide (see Figure 3). *F. officinalis* has a corolla of similar dimensions but possesses much smaller sepals. The fruits of *F. densiflora* are also very distinct, being almost circular in outline when viewed from the side and with a very rough (rugose) periderm. The outlines of other British fumitory fruits, with the exception of the *Microsepalae*, are seldom as spheroid.

Subsection *Officinales* is represented in the county by *F. officinalis* ssp. *officinalis* and *F. officinalis* ssp. *wirtgenii*. These differ in being tetraploid and hexaploid respectively (Daker, 1964), and are probably best distinguished from one another by the difference in dimensions of their sepals - 2.5-3.5 x 1-1.5 mm in ssp. *officinalis* and 1.5-2 x 1 mm in ssp. *wirtgenii*. The fruits of both species are ovate in outline with a very narrow base; those of ssp. *officinalis* have an emarginate apex, however, whereas those of ssp. *wirtgenii* tend to be more truncate. With a little practice the two can usually be separated with this character (see Figure 4): they are quite distinct from other British fumitories. In view of the variation shown by ssp. *wirtgenii*, especially on the continent, the authors have not followed Soler (1983) in retaining it at specific level.



F. capreolata *F. muralis* ssp. *boraei* *F. officinalis*



F. purpurea *F. bastardii* *F. wirtgenii*

Figure 4. *Fumaria* fruit morphology.

DISTRIBUTION

The county of Avon is not well known for *Fumaria* species. As White (1912) pointed out, it is remarkable that, in so large an area, the genus should be so imperfectly represented. Seven of the ten British species have been recorded in the county (White, 1912; Riddlesdell *et al.*, 1948;

Roe, 1981):- *F. capreolata*, *F. purpurea*, *F. bastardii*, *F. martinii*, *F. muralis*, *F. densiflora* and both subspecies of *F. officinalis*, though most are infrequent. With the exception of *F. capreolata* and *F. bastardii*, which are plants of hedgebanks although sometimes encountered as arable weeds, the fumitories are weeds of arable and disturbed ground. *F. officinalis* is widespread and common throughout. *F. capreolata*, of which all British populations are represented by ssp. *babingtonii* (Pugsley) P.D. Sell, has long been known from the southern part of the county, especially in the Axbridge/Cheddar area and elsewhere in Area 9 of N. Somerset, where it is native. It has also been recorded as a casual at Ashley Down, Crew's Hole and Stapleton (all Bristol, V-c 34) and was known on Steep Holm in a deserted cultivation from 1890 to at least 1910. The remaining species are sufficiently rare and restricted in their distribution in Avon to warrant the listing of all records, although it is worth noting that *F. muralis* ssp. *boraei* has been recorded with increasing regularity since 1950 and can no longer be considered very rare, as it was at the time of the publication of White's flora (1912).

Two areas, some twenty five miles apart, are perhaps worthy of special mention. No less than five fumitories were recorded on dumped soil below Cheddar Wood, Axbridge in 1980: *F. capreolata*, *F. muralis* ssp. *boraei*, *F. bastardii*, *F. officinalis* ssp. *officinalis* and *F. officinalis* ssp. *wirtgenii*. The Axbridge/Cheddar area is the centre of native populations of *F. capreolata* and provided the first record of *F. bastardii* in the south of the county. To the north of Bristol, in market gardens at Bromley Heath, Downend four species are sometimes seen growing together. Near here *F. densiflora* was discovered for the first time in the county in 1855 and it has been seen again in and near the market gardens in 1964, 1977 and 1984. Although it is known to be somewhat sporadic in its appearances, the lack of records during more than 100 years between 1855 and 1964 suggests lack of botanical visits to the site rather than non-appearance of the plant.

Section *Grandiflorae*

Fumaria purpurea Pugsley

pre-1912	Cultivated ground, hillside, Christon, V-c 6; Mrs E.S. Gregory, conf. H.W. Pugsley.

Fumaria bastardii Bor. (*F. confusa* Jord.)

pre-1881	Cornfields near Fishponds, V-c 34; J.W. White.
1909	Allotment ground, Shirehampton, V-c 34; J.W. White.
1930	Near Cheddar, V-c 6; Mrs C.I. & N.Y. Sandwith.
1976	Compton Dando, V-c 6; E. Paskin, conf. Dr M.G. Daker. Still there, 1984.
1980	Abundant on tipped soil, Axbridge, V-c 6; G.P. Kidder, conf. A.L. Grenfell. Still there, 1984, A.L. Grenfell, R.S. Cropper.

Fumaria martinii Clavaud (*F. paradoxa* Pugsley)

1920	Combe Down, V-c 6: Mrs C.I. Sandwith.

Fumaria muralis Sond. ex Koch ssp. *boraei* (Jord.) Pugsley (*F. boraei* Jord., *F. confusa* sensu Murray & White)

1900	Hedgeside, Wrington, V-c 6; Mrs E.S. Gregory.
1909	Watering-place on R. Frome, Iron Acton, V-c 34; C. Bucknall, det. H.W. Pugsley.
1910	Single plant, mangold field, Clapton-in-Gordano, V-c 6; J.W. White. Single plant, oat field, Fishponds, V-c 34;

J.W. White, det. H.W. Pugsley.

1915 Border of cornfield, Nibley, V-c 34; Miss I.M. Roper, "not far from a rivulet that drains into the Frome above the spot where Mr Bucknall's plant was found".

1948 Garden, Bath, V-c 6; D.E. Coombe.

1953 Quarry, Uphill, V-c 6; G.W. Garlick. Cornfield near Yate, V-c 34; G.W. Garlick (perhaps Miss Roper's 1915 site).

1956 Leap Bridge, Downend, V-c 34; G.W. Garlick. By the Ridge School, Yate, V-c 34; G.W. Garlick.

1959 On waste ground, Downend, v.c. 34; G.W. Garlick (some plants with white flowers). Known here until 1964.

1978 Rubbish tip, Wellsway, Bath, V-c 6; R.G. Randall, conf. Dr M.G. Daker.

1979 Abundant in potato crop, market gardens, Bromley Heath, Downend, V-c 34; A.L. Grenfell. Noted here in most years from 1973 to 1984

1980 Several plants on tipped soil, Axbridge, V-c 6; A.L. Grenfell & G.P. Kidder.

1981 Single plant, track below Cheddar Wood, Axbridge, V-c 6; R.S. Cropper. Rubbish tip, Odd Down, Bath, V-c 6; D.E. Green.

1984 Locking tip, Weston-super-Mare, V-c 6; T.G. Evans & A.L. Grenfell. Brislington (Eastwood Farm) tip, V-c 6; A.L. Grenfell. Elberton (Harnhill) tip, V-c 34; T.G. Evans & A.L. Grenfell.

Section *Fumaria* (*Parviflorae*)

Fumaria densiflora DC. (*F. micrantha* Lag.)

1855 Hedge, Downend, V-c 34 (as *F. capreolata*); Herb. J.H. Cundall. "... Mr Pugsley remarks that a hedge is a very unusual locality" - *Flora of Gloucestershire*.

1922 Casual, Bedminster, V-c 6; Mrs C.I. & N.Y. Sandwith.

1964 Allotment, Oldbury Court, Fishponds, V-c 34; Dr D. Munro-Smith, conf. N.Y. Sandwith. Waste ground by new Downend-Moorend road, V-c 34; Dr D. Munro-Smith, conf. N.Y. Sandwith.

1977 Abundant weed in market gardens, Bromley Heath, Downend, V-c 34; A.L. Grenfell, conf. P.M. Benoit.

1984 20 plants among leek seedlings, *ib.*; A.L. Grenfell

Fumaria officinalis ssp. *wirtgenii* (Koch) Arcangeli

1881 Knowle, V-c 6; W.H. Painter, BM.

1918 Keynsham, V-c 6; Miss I.M. Roper.

1980 On tipped soil, Axbridge, V-c 6; A.L. Grenfell.

1981 Garden, Alveston, V-c 34; Dr D. Gledhill per P.L. Smith, det. A.L. Grenfell.

1983 Disturbed ground, Old Market, Bristol, V-c 34; A.L. Grenfell.

1984 Locking tip, Weston-super-Mare, V-c 6; T.G. Evans & A.L. Grenfell. Brislington (Eastwood Farm) tip, V-c 6; A.L. Grenfell & J. Scott. Garden weed, Winterbourne, V-c 34; A.L. Grenfell (known here since 1973). Market gardens, Bromley Heath, Downend, V-c 34; A.L. Grenfell & P.L. Smith (first noted here in 1978). Building site, St Philips, Bristol, V-c 34; A.L. Grenfell.

SUMMARY

Though *Fumaria* species are not common in Avon, most of the British species have been recorded. The most notable exceptions are the Cornish *F.*

occidentalis, which possibly could not survive the harsher winters of this more northerly county, and small-flowered *F. parviflora* and *F. vaillantii* which are largely restricted to the chalk of the south-eastern counties.

Identification is not difficult if all parts of a well-grown, mature plant are available: floral characteristics, fruits and inflorescences are the most important taxonomic features.

ACKNOWLEDGEMENTS

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AVON & DISTRICT ENTOMOLOGICAL REPORT, 1984

Compiled by the Recorders of the Entomological Section

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A.H. Weeks

A number of changes have been made in this Report for 1984, the most important being an alteration in the geographical area covered by the Report from a loosely defined 'County of Avon and adjacent areas of entomological interest' to a precise area comprising vice counties 6 (North Somerset) and 34 (West Gloucestershire) but excluding that part of V-c 34 lying west of the Severn. The northern boundary follows approximately the R. Frome from a point south of Cirencester on the Gloucestershire/Wiltshire boundary to the R. Severn at Upper Framilode whilst the southern boundary extends from the Parrett estuary south of Burnham-on-Sea, south-east to below Somerton and then north-east to the Somerset/Wiltshire boundary near Frome.

In previous Reports records from outside the County of Avon in Gloucestershire, Somerset and Wiltshire were denoted by G, S or W respectively. This practice will no longer be used - sites and localities will be coupled with the nearest main village or town unless previously designated in listings given in the Report, 1982 and subsequent additional listings. As the recording area on which this Report is based is identical now to that used by the Bristol Regional Environmental Records Centre (BRERC), it is essential that site and locality designation should be standardized to facilitate storage in, and retrieval from, the BRERC databank.

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DESIGNATION OF SITES AND LOCALITIES

This listing is additional to the one given in this Report for 1982. The grid references refer to the centre of the site or locality but should not be used on record cards on which it is important to enter the precise grid reference where each species was found. On large sites this could be a kilometre or more from the references given below.

V-c 34

Blaise Castle, nr Henbury, Bristol	ST 559 783
Inglestone Common, nr Wickwar	ST 760 880
Littleton Brick Pits, nr Littleton-upon-Severn AWT Reserve	ST 591 912

V-c 6

Cadbury Hill, nr Yatton	ST 442 650
Lime Breach Wood, nr Tickenham AWT Reserve	ST 465 726

Nailsea Moor, nr Nailsea	ST 443 703
Tickenham Moor, nr Tickenham	ST 445 710

WEATHER SYNOPSIS (compiled by A.H. Weeks)

The weather for 1984 was similar, in some respects, to that of 1983. Both years started warm and wet, and had hot dry summers followed by autumn weather which set in early in September. The springs were very different, however, that of 1984 being warmer and drier. Table 1 (below) illustrates these similarities and differences.

	MAXIMUM TEMPERATURES °C		RAINFALL	
	1983	1984	1983	1984
Winter (Dec-Feb)	+0.2°	+0.4°	99%	126%
Spring (Mar-May)	-0.8°	+0.2°	143%	78%
Summer (Jun-Aug)	+3.5°	+2.8°	45%	47%
Autumn (Sep-Nov)	+0.5°	+0.8°	89%	141%

As a result, there were also similarities and differences between the local butterfly records for the two years. Both warm, wet winters had an adverse effect on hibernating Small Tortoiseshells (scarce in the springs) and the hot summers brought out the summer 'browns' and the new broods of the nymphalids in abundance - the numbers of Meadow Browns, Marbled Whites and Gatekeepers in 1984 possibly exceeding the large numbers seen in the previous year. Small Tortoiseshells were also out in phenomenal numbers from late June onwards. The great difference lay in the weather in April and May: in 1983 these months were cooler and much wetter than average, resulting in remarkably late flights of the spring species; while in 1984, April was warm and very dry, as was the first half of May. Thus insects in the larval and pupal stages were afforded some six to seven weeks of ideal conditions for development and emergence. Some early dates were noted, for example, the Small Blue by mid-May, the Small Pearl-bordered Fritillary in late May and the Dark Green Fritillary by the last week of June.

The 1984 weather, in more detail, was as follows:- Temperatures. Only March and May were slightly cooler than average. All other months were warmer to various extents, particularly August (although not quite so much as in 1983). Mean maximum temperatures in the district in April were 2.5°C up on average (1.0°C down in 1983), while the corresponding figures for July were 2.5° to 3°C up (5° to 6°C in 1983) and for August 2.5° to 3°C up (3° to 4°C in 1983).

Rainfall. For the calendar year rainfall was only slightly below average. Wet months were January (180 to 200% in the area), May 105 to 140%, mostly falling in the second half of the month, September (125 to 170%), October (102 to 103%) and November (150%). All other months were drier, with an astonishingly low figure of 5% in April. The three summer months yielded 47% overall, 36 to 50% in June, 30 to 40% in July and 55 to 65% in August, all of which fell during thundery activity and therefore having varying distribution and local effects.

Sunshine. The months of January, April, June, July, August and December were above average for sunshine (April about 150%, June 135%, July 140% and August 105%). May and September yielded near-average amounts of sunshine, while the other four months fell short.

BUTTERFLIES (*Lepidoptera*) by G.W. Sorrell & A.H. Weeks

1984 was, on the whole, another good year for butterflies in the area, although not as good as 1983. On the 'plus' side were the exceptionally good seasons enjoyed by the summer 'browns', Large Skippers, Small Tortoiseshells (in summer), Silver-washed Fritillaries and White Admirals. The last two not only displayed themselves in larger numbers than for many years at their usual sites but were also noted at widely separated and new locations. Although mostly singles, these sightings give a hint that the White Admiral may be extending its range more widely over the two vice counties comprising our recording area. The Large Tortoiseshell was again seen nr Flax Bourton where it had been recorded in 1982 and 1983. The White-letter Hairstreak was noted at several new locations and the Adonis Blue was again found at a site on Mendip. Of course, one could not expect another good Clouded Yellow year like 1983, but the numbers of records from late August to October was greater than in the years before 1983. On the 'minus' side, Red Admirals were scarce in 1984 and Painted Ladies were almost totally absent, possibly because of adverse weather conditions in the Mediterranean in spring. Southern France, the west and central Mediterranean and North Africa where these species originate, were much cooler and wetter than normal from March to May. It is possible that *Vanessa atalanta* and *V. cardui* suffered population reductions on their home ground, in addition to which there was a marked absence of southerly winds in spring and early summer to help would-be migrants reach these shores. Unusually, the dominant wind directions over Great Britain were NW through N to NE in March, N to NE in April and May, W to NW in June and SW to NW in July.

Lastly, has a new species of Peacock - *Inachis io religioso* - appeared on the scene? A Peacock joined the congregation at a carol service in a Portishead church on 17 December and another did likewise at Abbots Leigh church on Christmas Day.

The scientific and vernacular names, also the order of species, follow those given in the check list by Higgins & Riley (1975).

Pieris brassicae (Large White) Common throughout the district: first noted 25 April, last 16 October. Most numerous from mid-July to mid-August.

P. rapae (Small White) Common throughout the district: first noted 13 April, last in free flight 27 October.

P. napi (Green-veined White) Widespread but in smaller numbers than in recent years. First seen 20 April, last 23 September. Highest numbers in late July.

Anthocaris cardamine (Orange Tip) Widespread. Numbers not high but possibly better than in recent years. Enjoyed quite a long season - first noted 14 April, last 19 June. Most numerous late April to late May; 22 at Chew Valley Lake, 27 April and ten, Charterhouse, Mendip, 29 May.

Colias crocea (Clouded Yellow) A number of sightings, over a wide area, of singles, 13 April to 16 October, mostly in early September.

C. crocea f. *helice* Stoke Bishop, Bristol, 9 September.

Gonepteryx rhamni (Brimstone) A reasonable year: first seen, Yatton, 17 February; two, Chew Valley Lake, 1 March and then in fair numbers throughout the spring. Large summer brood on the wing in July and early August, last seen 11 November. Highest numbers - 11, Goblin Combe, nr Cleeve, 27 April and 14, same place, 7 May; 15, Shapwick NNR, 9 August and 24, Great Breach Wood, nr Compton Dundon, 19 August.

Limenitis camilla (White Admiral) An unusually large number of records received from all over the district, including a first from central Bristol, mostly of singles. The colony in Wetmoor NR had a good season with maximum of 35 on 22 July; several at Shapwick, 15 July.

Inachis io (Peacock) Good numbers both in spring after hibernation and in the summer brood. First noted 9 February, last seen flying 9 December. Highest numbers in April, July and August, with over 30, Chipping Sodbury, 6 August; over 50, Keynsham, 4 August and over 60, Patchway, nr Bristol, on 10th. Fresh specimens seen in October suggest a late brood.

Vanessa atalanta (Red Admiral) Individuals apparently disturbed from hibernation, 11 January, Redland, Bristol and 18 February, Weston-super-Mare. Otherwise, first noted 5 April, last 26 November. Early summer immigrants very few: only singles June and July, but new brood provided better numbers in August-October. Highest count, six, Congresbury, 14 August.

V. cardui (Painted Lady) Scarce, very few records: singles, Vallis Vale, nr Frome, 29 June; Middle Hope, 10 July and Weston-super-Mare, 29 August and 23 September.

Nymphalis polychloros (Large Tortoiseshell) Noted early and late July at site nr Flax Bourton where seen in 1983.

Aglais urticae (Small Tortoiseshell) Spring numbers were small, but there was a population explosion in late June. Highest counts - over 100, Charterhouse, Mendip, 30 June; over 150, Chew Valley Lake, 22 August and more than 200, same place, 27 August; over 150, Marshfield, same date. Remained on the wing in some numbers until late October. First noted 6 March, last on 9 December.

Polygonia c-album (Comma) A relatively poor year, with low spring counts. First noted 22 March, last 12 October. Highest counts - 12, Leigh Woods, nr Bristol, 16 July; five, Goblin Combe, 19 July and 12, Wraxall, 11 August.

Argynnis paphia (Silver-washed Fritillary) This species enjoyed its best season for many years and appeared, or reappeared, at sites where it had been absent previously, or recently. First noted 20 June, last 26 August. It was especially numerous at Wetmoor NR and adjacent woodlands where nearly 80, late June - August, Inglestone Common; 30, Great Breach Wood, nr Compton Dundon, 19 August.

Mesoacidalia aglaja (Dark Green Fritillary) Still only in small numbers, but appears to be more widespread over the area. First noted 30 June, last on August 11. Highest number of five at both Charterhouse, Mendip, 30 June and Goblin Combe, 26 July.

Fabriciana adippe (High Brown Fritillary) Remains very scarce. Single at Walton Down, nr Clevedon and two at Dolebury Warren, 17 June.

Clossiana euphrosyne (Pearl-bordered Fritillary) One at Charterhouse, Mendip, 9,10 June.

C. selene (Small Pearl-bordered Fritillary) More encouraging numbers seen on its usual Mendip sites. First seen at Dolebury Warren, 30 May and last at Priddy on 13 August. Highest count - up to ten at Charterhouse, Mendip, 30 June.

Euphydryas aurinia (Marsh Fritillary) Noted only at reserves at Wetmoor, Charterhouse and Shapwick. First noted 13 May, last 27 June with highest count of more than ten at Shapwick.

Melanargia galathea (Marbled White) Another good year: recorded at many locations throughout the area (and is possibly extending its range) in good numbers. First record 17 June, last 2 September. Highest counts - over 60, nr Long Ashton, Ashton Court, nr Bristol and Barrow Gurney on 30 June; over 50 at Dolebury Warren, 5 July and Filton, 12 August; slightly lower numbers at Goblin Combe from 26 June, Burrington Common, nr Burrington, 5 July; Charterhouse, 5 August and Velvet Bottom, nr Charterhouse on 6th. Numbers fell sharply after first week of August.

Hipparchia semele (Grayling) Mostly small numbers on its usual rocky slopes in the Mendips. First seen 15 June, last 26 August, with highest numbers of about 20, Goblin Combe, 1 July; six, Dolebury Warren, 5 July and ten, Draycott, early August. Other sites were Crook Peak, nr Compton Bishop, Middle Hope, Uphill, Brean Down and a vagrant at Henleaze, Bristol.

Maniola jurtina (Meadow Brown) Common throughout the area with some very high counts from late June to mid-August. First noted 10 June, last 23 September,

Aphantopus hyperantus (Ringlet) Reasonable numbers seen at widely separated sites. First seen 11 June, last 19 August. Highest counts - over 20, Burrington Common, nr Burrington, 5 July; more than 25 at Wetmoor NR, 7 July and over 30, Goblin Combe, 19 July. Ab. *caeca* seen at Dolebury Warren, 5 July.

Pyronia tithonus (Gatekeeper) Another season with very high numbers. First seen 21 June, last 17 September. Counts of well over 100 at Blagdon and Pensford, third week July, nr Aust, 16 July and Cadbury Hill on 20th and 26th and also at Bourton Combe, nr Flax Bourton on 21st same month. Abundant also at Goblin Combe, Shapwick and Great Breach Wood, nr Compton Dundon and Middle Hope. There was a sharp drop in numbers in late July.

Coenonympha pamphilus (Small Heath) Fairly widespread but in small numbers. First seen 2 May, last 29 September. Highest counts - over 50, Dolebury Warren, 5 July and early August; over 30 at Goblin Combe, 1 July and more than 25, Burrington Common, nr Burrington, 5 July.

Pararge aegeria (Speckled Wood) A relatively small emergence in the spring, but better numbers from July onwards. Widespread over the area; first seen 19 April, last 14 October. Highest counts of 20 at Congresbury and over 20, Goblin Combe, on 22 July.

Lasiommata megera (Wall Brown) District still thinly populated with numbers small in May and June but better in August. First seen 12 May, last 28 August although a late single was seen at Weston-super-Mare, 26 October. Highest count of 15 at Sand Bay, 26 August.

Hamaeris lucina (Duke of Burgundy Fritillary) Only record is of about 12, Midger Wood, Lower Kilcott, 19 May.

Quercusia quercus (Purple Hairstreak) Recorded at a number of sites from Michael Wood, nr Stone in the north to Axbridge in the south. First seen 13 July, last 19 August with highest count of 25 at Wetmoor NR.

Callophrys rubi (Green Hairstreak) Reported in widely separated areas, including some new sites in North Avon, but most frequent on limestone grassland on the Mendips and foothills. First seen 26 April, last 22 July. Highest count of over 20 nr Axbridge in mid-June; several at Charterhouse, Mendip, 17 June.

Strymonidia w-album (White Letter Hairstreak) An encouraging increase in the number of sightings, mostly from new sites. First seen 15 July, last 12

August. Highest count - 10-15, Midford, 5 August.

Lycaena phlaeas (Small Copper) Widespread but thinly populated. Poor spring showing but better numbers in later broods. First seen 9 May, last 16 October. Highest counts - 'abundant', Middle Hope, 11 August; 21, Velvet Bottom, nr Charterhouse, 6 and 24 August, same place 29 September; 15, Charterhouse, Mendip in mid-August.

Aricia agestis (Brown Argus) Quite widespread with rather better numbers than in 1983. First seen 12 May, last 12 September. Highest counts - over 50, Dolebury Warren, 18 August; 25, Draycott, 12 August; over 20, Cadbury Hill, 8 August and over 20, Goblin Combe, 20 May.

Cupido minimus (Small Blue) A poor year with drastically reduced numbers at Dolebury Warren. First seen 13 May, last 2 September - which suggests a partial second brood. Highest counts, 25-30, Dolebury Warren, during June; smaller numbers from seven other widely spread sites.

Celastrina argiolus (Holly Blue) Widespread, including Bristol suburbs, but in fairly small numbers. First seen 20 April, last 28 September. Highest count of ten, Weston Woods, nr Weston-super-Mare.

Lysandra coridon (Chalkhill Blue) Eleven sites reported in southern Cotswolds and Mendips, Brean Down and Butleigh. First seen 22 July, last 26 August - highest count about 300 at Draycott.

L. bellargus (Adonis Blue) Several noted at site on southern Mendips where seen in 1983.

Polyammatus icarus (Common Blue) Widespread with good numbers locally. First seen 20 May, last 5 October. Highest counts - over 50, Dolebury Warren, 18 August; over 35, Middle Hope, 9 June and 'abundant', same place on 11 August; Cadbury Hill, 8 August; Great Breach Wood, nr Compton Dundon, 19 August; over 25, Goblin Combe, 28 August and along Yatton end of Cheddar Valley Railway track, 20 August.

Pyrgus malvae (Grizzled Skipper) Few records received. First seen 12 May, last 30 June. Highest counts - over ten, Dolebury Warren, 30 May and six, Goblin Combe, 20 May. Other sites where seen were Crook Peak, nr Compton Bishop, Charterhouse and Priddy, Mendip.

Erynnis tages (Dingy Skipper) Small numbers at previously known sites reported by only two observers. First seen 19 May, last 30 May. Highest count, 14, Stinchcombe, 19 May; six, Goblin Combe, 20 May. Also noted at Midger Wood, Lower Kilcott, Burrington Combe and Dolebury Warren.

Thymelicus sylvestris (Small Skipper) Numbers not as great as in past years. First seen 18 June, last 19 August. Highest counts - 24, Charterhouse, Mendip, 5 August; 12, Cadbury Hill, 26 July; over 10, Middle Hope, 14 July; at Goblin Combe, 19 July and Henleaze, Bristol, 22 July.

T. lineola (Essex Skipper) Seen at Michael Wood, nr Stone, 13 July and Priddy, Mendip, 20 July.

Ochlodes venata (Large Skipper) A reasonable season especially in South Avon where reported as widespread. First seen 8 June, last 6 August. Highest counts - over 25, Cadbury Hill, 25 June; over 20, Goblin Combe, 26 June and 12, Charterhouse, Mendip on 30th.

MOTHS (*Lepidoptera*) by K.H. Poole

In some ways 1984 was, for moths, very similar to 1983 in that a fine summer did not produce the results that might have been expected. Although good numbers appeared at light on some nights, surprises were very few, and common species such as the Large Yellow Underwing and Heart & Dart, normally present in hundreds, were comparatively scarce. Migrant moths, even the ubiquitous Silver Y, were scarce, though larvae and pupae of the Death's Head Hawk were found in numbers in several localities and there were several reports of the Humming Bird Hawk. Only one Vestal was noted. In the following selection from records received preference has been given to those from several localities in the northern half of our district for which very little has been published although, as usual, the bulk of our records came from the south of the Avon.

The most interesting discoveries were the Fen Wainscot on Mendip - this being a westward extension of its known limits of Dorset and Hampshire and a first record for Somerset; and the Sloe Pug at Knowle, another first record. Further afield, the Cypress Pug (*Eupithecia phoeneciata*) was noted at Great Breach Wood, nr Street, and also at Wrantage, nr Taunton, just outside our recording area in V-c 5. Associated with *Cupressus*, it has spread along the South Coast and inland since its appearance in Cornwall in 1959. The Great Breach Wood record is the first for V-c 6.

Names are in accordance with J.D. Bradley and D.S. Fletcher, *A Recorder's Log-book of British Butterflies and Moths* (1979).

Sphinx ligustri (Privet Hawk) Stoke Bishop, Bristol, 9 July (HER) and Knowle, Bristol, 18 July (HKB).

Agrius convolvuli (Convolvulus Hawk) Two, Westbury-sub-Mendip, 15 September (HKB).

Acherontia atropos (Death's Head Hawk) More than twenty, Westbury-sub-Mendip, 15 September (HKB); many larvae and pupae, Churchill and Kingston Seymour, same month (EAFD).

Macroglossum stellatarum (Humming Bird Hawk) Yatton, 7 July (AHW); Middle Hope, nr Weston-super-Mare, 13 July (RA); Shapwick Heath, 21 July (RSC) and Crook Peak, nr Compton Bishop on 19th and 23rd and another, same place, 1 August (RA); larvae, Weston-super-Mare in August (KHP) and Middle Hope again on 30 September and 10 October (RA).

Drymonia ruficornis (Lunar Marbled Brown) Weston-in-Gordano, 22 April (HKB).

Tethea or (Popular Lutestring) Horton, nr Chipping Sodbury, 21 July (HKB).

T. ocularis (Figure of Eighty) Horton, nr Chipping Sodbury, 15 June (HKB).

Leucoma salicis (White Satin) Weston-super-Mare, 13 July (CSHB).

Atolmis rubricollis (Red-necked Footman) Stock Hill, nr Priddy, 25 June (HKB) and 'many thousands', same place, 1 July (AFS).

Nudaria mundana (Muslin Footman) Horton, nr Chipping Sodbury, 21 July (HKB).

Acronicta leporina (Miller) Horton, nr Chipping Sodbury, 21 July (HKB).

A. alni (Alder Dagger) Horton, nr Chipping Sodbury, 15 June (HKB).

Agrotis ripae (Sand Dart) Berrow, 27 June (CSHB).

Apamea oblonga (Crescent Striped) Berrow, 19 July (CSHB).

Celaena leucostigma (The Crescent) Berrow, 30 August (CSHB).

Ochropleura praecox (Portland Moth) Berrow, 23 August (KHP) - a new record for Berrow although a few have been recorded at Weston-super-Mare.

Antitype chi (Grey Chi) Congresbury, (GWS).

Eremobia ochroleuca (Dusky Sallow) Middle Hope, Weston-super-Mare, 14 July (GWS) and 16 July (EAFD).

Ipimorpha subtusa (The Olive) Knowle, Bristol, 23 July and Midger Wood, Lower Kilcott, 12 August (HKB).

Hoplodrina ambigua (Vine's Rustic) Burnham-on-Sea, 17 August (HKB); Berrow in August and Weston-super-Mare, May and August (CSHB). This moth, possibly a migrant, was unusually common.

Arenostola phragmitidis (Fen Wainscot) Priddy, 25 August and 2 September (EAFD) and also a female, same place on 6th (CSHB) - a new record for Somerset.

Panolis flammea (Pine Beauty) Abbots Leigh, nr Bristol, 25 April (AFS).

Scoliopteryx libatrix (The Herald) A few, Biddlecombe Rift Cave, West Horrington, 8 January (RSC).

Lithophane leautieri (Blair's Shoulder Knot) Congresbury, 5 October (GWS) and Knowle, Bristol on 16th (HKB).

Rhodametra sacraria (The Vestal) Congresbury, 24 August (GWS).

Triphosa dubitata (The Tissue) Biddlecombe Rift Cave, West Horrington, 8 January (RSC).

Eupithecia tripunctaria (White-spotted Pug) Horton, nr Chipping Sodbury, 4 June and Midger Wood, Lower Kilcott, 12 August (HKB).

E. trisignaria (Triple-spotted Pug) Midger Wood, Lower Kilcott, 12 August (HKB).

E. tantillaria (Dwarf Pug) Horton, nr Chipping Sodbury, 4 June (HKB).

E. valerianata (Valerian Pug) Larvae common, Wells, 22 July (HKB).

E. virgaureata (Golden Rod Pug) Priddy, 25 June (HKB).

Chloroclystis chloerata (Sloe Pug) Knowle, Bristol, 29 July (HKB) - a first record for the district for this recent addition to the British list.

Abraxas sylvata (Clouded Magpie) Several, Weston-super-Mare, June (CSHB) and Midger Wood, Lower Kilcott, 12 August (HKB).

Plagodis dolabraria (Scorched Wing) Congresbury, 17 June (RWR).

Paradarisa extersaria (Brindled White-spot) Horton, nr Chipping Sodbury, 15 June (HKB) and at Weston-super-Mare, late May, June (CSHB).

Gnophos obscurata (Annulet) Priddy, 20 July and Horton, nr Chipping Sodbury, on 21st (HKB).

Bena prasinana (Scarce Silver Lines) Priddy, 20 July (HKB).

DAMSELFLIES AND DRAGONFLIES (*Odonata*) by S. Randolph

The year was generally a good one for dragonflies with numbers of adults of most species well up apart from the Ruddy Darter which was noticeably less common at some of its breeding sites. With the drying-up of smaller pools and rhines in the latter half of the hot, dry summer, many nymphs must have perished in such conditions. A total of 248 records was received, almost all of these supplied by four recorders only. About one tenth of this year's records are for new breeding sites. These have been added to the

Odonata distribution maps for this area which will form a provisional atlas of the 23 species known to be breeding in vice-counties 6 and 34.

The Common Hawker suffered badly from the drying-up of its main breeding sites on Mendip near Priddy. Normally many of this species can be expected to emerge from this small pool but not a single specimen was recorded this year after two consecutive seasons of drought. The larger 'Waldegrave' pool nearby was also in danger of drying and the numbers of the Four-spotted Chaser flying in the immediate area (usually several thousands) were greatly reduced, as were the numbers of the Downy Emerald and the Azure Damselfly. Strangely, the populations of the Black Darter and the Emerald Damselfly from the same pool appeared to be unaffected.

The scientific names and the order of species follow the list on the recording card produced for the National Recording Scheme for *Odonata*.

Zygoptera (Damselflies)

Calopteryx virgo (Beautiful Demoiselle) No records received for this very local species.

C. splendens (Banded Demoiselle) Very common on R. Avon, Freshford, 17 June and abundant on R. Frome, Winterbourne Down, nr Bristol, 1 July (SR). New probable breeding sites include Huntspill Moor, nr East Huntspill and Panborough Drain, nr Theale (JMB). Several on R. Yeo, Tickenham (KWM) and along rhine, Godney Moor, nr Godney (RSC).

Lestes sponsa (Emerald Damselfly) Three records from known breeding sites - Frances Plantation, East Harptree (JH); Black Down and Priddy Mineries, Mendip (JMB).

Platycnemis pennipes (White-legged Damselfly) Three records including a new probable breeding site, Shapwick Heath NNR, where several seen, 21 July (RSC). Abundant on R. Avon between Freshford and Sharpstone, 17 June (SR).

Pyrrhosoma nymphula (Large Red Damselfly) A very early sighting of a male, Tealham Moor, nr Mark, 28 April (RSC). Common, Kenn Moor, nr Kenn, 30 June, and also adjacent Nailsea Moor (JH); Hunstrete Lake, nr Chelwood and small numbers on R. Chew, Publow - both new sites (JH).

Ischnura elegans (Blue-tailed Damselfly) Large numbers, Littleton Brick Pits, nr Littleton-upon-Severn, 9 June and many on R. Frome, Winterbourne Down, nr Bristol, 1 July (SR). Four new sites:- on R. Chew, Publow (JH); on R. Cripps, Huntspill Moor, nr East Huntspill and Panborough Drain, nr Theale (JMB); Godney Moor, nr Godney, 7 July (RSC).

Enallagma cyathigerum (Common Blue Damselfly) Only 15 records received but noted as common at Hunstrete Lake, nr Chelwood (JH) and plentiful around lagoons, Shapwick Heath, 15 July (RSC).

Coenagrion pulchellum (Variable Damselfly) Seven records for this uncommon and very local species. Thirty-six males, Chilton Moor, nr Chilton Polden, 30 May; 12 males, Cheddar Moor, nr Draycott and 13, also all males, nr Theale, 15 June (JMB). Small number of males, Kenn Moor, nr Kenn, 3 June (JH). One new record of 'pockets along rhines' containing considerable numbers of both sexes, Nailsea Moor, nr Nailsea (JH).

C. puella (Azure Damselfly) Common at Crox Bottom, Hartcliffe, Bristol, also at Kenn and Nailsea Moors, nr Nailsea and Hunstrete Lake, nr Chelwood (JH). New record for Godney Moor, nr Godney, 7 July (RSC).

Erythromma najas (Red-eyed Damselfly) Five records for this species which seems to be spreading through the area as it extends its range westwards.

A new record at Hunstrete Lake, nr Chelwood, where four males and a pair seen (female ovipositing) (JH); single male at Shapwick Heath (JH) and at least eight males, Priddy Mineries, nr Priddy (JMB).

Anisoptera (Dragonflies)

Brachytron pratense (Hairy Dragonfly) Eleven records for this rather local species. A new record at Nailsea Moor, nr Nailsea where common, including mating pairs (JH); also males seen on the nearby Kenn Moor (JH).

Aeschna juncea (Common Aeschna) Only six records received with largest numbers reported from Frances Plantation, nr East Harptree, 18 September (JH); two males hawking along R. Avon, Freshford, 26 August (RSC).

A. grandis (Brown Hawker) At least four males along ½ mile stretch of R. Frome, Winterbourne Down, nr Bristol, 1 July and two males patrolling edge of wood by same river, Oldbury Court, Eastville, Bristol, 29 July (SR). Two new sites:- three males, and two females ovipositing, Crox Bottom, Hartcliffe, Bristol and a single female ovipositing, Hunstrete Lake, nr Chelwood (JH).

A. cyanea (Southern Hawker) Four new breeding sites - Crox Bottom, Hartcliffe, Bristol; Hunstrete Lake, nr Chelwood; Vobster, nr Coleford and Kilmersdon, nr Radstock, 18 July (JMB).

A. mixta (Scarce Hawker) Recorded at Crox Bottom, Hartcliffe, Bristol where common and mating observed - a new site (JH); Mudgley, Westhay Moor, nr Westhay, 16 September and Huntspill, 11 October (JMB).

Anax imperator (Emperor Dragonfly) Sixteen records received including two new sites - several exuviae, small pond, Whitchurch, Bristol, 18 June and female nearby, 26 June (SR); several males, and females ovipositing, Crox Bottom, Hartcliffe, Bristol (JH). Other records include single female, woods, Wetmoor, nr Wickwar, 8 July (SR) and one ovipositing on two occasions, Hunstrete Lake, nr Chelwood (JH).

Cordulia aenea (Downy Emerald) One record from its only known breeding site in the area at Priddy Mineries, nr Priddy. In 1982 sixteen exuviae were found here, in 1983 twelve, and this year only two (JMB).

Libellula depressa (Broad-bodied Chaser) Three new sites - female ovipositing, Crox Bottom, Hartcliffe, Bristol (JH); female, Nailsea Moor, nr Nailsea (JH) and noted at Glastonbury Heath, nr Glastonbury (JMB).

L. quadrimaculata (Four-spotted Chaser) A new site recorded from Kenn Moor, nr Kenn where it was reported as frequent (JH). At Priddy Mineries, nr Priddy, numbers are usually in the thousands at peak emergence but this year due to the very low water level the population was severely reduced (JMB). Records from the Somerset levels include Tealham Moor, Catcott Heath, Stoke Moor (JMB) and also at Street Heath (RSC).

Orthetrum cancellatum (Black-tailed Skimmer) All the known breeding sites for this species in the district occur on the Somerset levels between East Huntspill and Glastonbury, and this year it was recorded from Catcott Heath, Westhay Heath, Shapwick Heath, Street Heath and Glastonbury Heath. Single male seen at a brackish pool, Kingston Seymour, nr Clevedon, 5 August (RSC).

Sympetrum striolatum (Common Darter) Three new sites reported - small numbers breeding, R. Chew at Publow (JH); Barrow Gurney, 31 July and 25-30, Lime Breach Wood, nr Tickenham, 3 August (SR).

S. sanguineum (Ruddy Darter) Ten records received including one of more than 100, Shapwick Heath NNR, 9 August (JEH, RMP). Also seen on the Somerset levels at Catcott Heath, Chilton Moor, Edington Heath and Westhay Heath, and on Mendip at Blackmoor, Priddy Mineries.

S. danae (Black Darter) Three records - two males, Tealham Moor, nr Mark, 18 July (JMB); very common, Frances Plantation, nr East Harptree, 18 August (JH) and at Priddy Mineries, nr Priddy where numbers at peak emergence in August were unaffected by very low water level (JMB).

BEETLES (*Coleoptera*) by R.W. Rowe

With one or two exceptions 1984 was no more than average for observations with approximately the same number of reporters as in previous years. The Section has few observers in the north, north-east and east of the recording area in V-c 34 so that the overall picture is rather one-sided. Can a plea be made for entomologists to be somewhat more venturesome in future and travel further afield to report on some of the more common beetles so that this summary becomes more balanced?

The two beetles for which a special look-out has been kept, the Wasp Beetle, *Clytus arietus*, and the Devil's Coach Horse, *Staphylinus olens*, were again reported on only two occasions. Is their existence less common than was supposed to be the case? I am indebted to Mr D.B. Atty for correcting a record of *Emus hirtus* made in 1981 (*vide* this report, 1981) which further examination showed to be a related and commoner species, *Ontholestes tessellatus*. However, the exciting news is of a definite sighting at Midger Wood of this rare species confirmed by Mr Atty, who informs us that this has always been a rare species. Its headquarters was N. Kent and there would seem to be no records of it in Britain anywhere since May 1950 (Kent) and August 1949 (Essex). Dr K.W. Miller supplied the notes on the *Coccinellidae* which appear below.

The nomenclature followed is that given in Kloet and Hincks, *A Check List of British Insects*, Vol. XI, Pt. 3, 2nd ed, 1977.

Bembidion lunulatum Fourc. Several under seaweed on dunes, Berrow, 10 March (RSC).

B. assimile Gyll. In tuft of grass, Chew Valley Lake, 3 January (RMP).

Cicindela maritima Lat. Several active along seaward side of dunes, Berrow, 21 April, (RSC).

Licinus depressus Payk. One running on ground, Charterhouse, Mendip, 5 May (RSC) - not recorded in Wilson's *Coleoptera of Somerset*.

Ochthebius subinteger lejolisi Muls. Four, in rock pool on shore, Middle Hope, 9 June (KWM).

Scaphidium quadrimaculatum Ol. Weston Woods, nr Weston-super-Mare, 11 March (GWS).

Emus hirtus L. One found running on wet, muddy track, Midger Wood, Lower Kilcott, 9 June (NL, conf. D.B. Atty). The previous record given in the Report, 1981 has been determined as *Ontholestes tessellatus* by Mr Atty and should be deleted.

Aphodius plagiatus L. Three under stones, Middle Hope, 14 April (RWR).

Dascillus cervinus L. Several swept from vegetation, Charterhouse, Mendip, 30 June (RMP, RWR).

Hedobia imperialis L. Found on boot of car, Congresbury, 15 June (RWR) - an unusual but not rare member of the *Anobiidae*.

Pediacus dermestoides F. The distinctive larva of this species under birch bark, Dursley Woods, nr Dursley, 4 March (KNA).

Prionychus ater F. Elytron found under loose bark of stump of horse chestnut, Whitcliff Deer Park, Berkeley, 21 October (KNA). Messrs. Brendell and Hammond, British Museum (Natural History), considered this very probably to belong to this species which has not been recorded in Gloucestershire since 1943 at Stanway and previously c. 1900 at Newnham.

Cassida murraea L. One Somerton Moor, nr High Ham, 22 April (RSC) - a very local species of the curiously structured 'tortoise beetles'.

Platyrrhinus resinosus Scop. Ashen Plains Wood, Waterley Bottom, nr Dursley 28 March (KNA).

Coccinellidae (Ladybirds)

As expected with the fine summer, ladybirds were plentiful in 1984 with eleven different species (possibly twelve when one doubtful species is verified) recorded from the district. This is the largest number of species noted in one year since we started to record this group in 1976.

Adalia bipunctata L. (2-spot Ladybird) Large numbers in central Bristol from late April to mid-July (RWR). This species is, of course, common but the numbers this year were apparently greater than usual. Only one melanic specimen was noted and I would ask members to report these together with some estimate of the proportion they represent of the total population.

Tytthaspis sedecimpunctata L. (16-spot Ladybird) Weston Moor, nr Walton-in-Gordano, 14 October (RSC). This uncommon species occurs usually in marshy places.

TRUE BUGS (*Hemiptera/Heteroptera*) by R.S. Cropper

The number of observers studying this group is very small and the number of records received remains disappointingly low. The following is a selection of my own records which refer to single specimens unless otherwise stated.

Rhyparachromus pini L. Several under log, margins of Cheddar Wood, nr Axbridge, 24 November.

Cymus glandicolor Hahn. Several on Tawny Sedge (*Carex hostiana*), Max Meadows, Winscombe, 22 July.

Nabis flavomarginatus Scholtz. Several in rank vegetation, Draycott, Mendip, 18 August.

Monalocoris filicis L. A few on trees, Compton Wood, Compton Martin, 20 May.

Dicyphus constrictus Boh. On Red Campion (*Silene dioica*), Rowberrow, nr Shipham, 23 September. This local species resembles the much commoner *D. errans* and occurs on plants which have secretory hairs.

Saldula pilosella Thom. Plentiful on mud of dried up pond, Steart, nr Stockland Bristol, 2 September. A local species found mainly near the coast at the margins of brackish pools and rhines.

Mesovelia furcata Mulsant & Roy. Amongst Branched Bur-reed (*Sparganium ramosum*) in pool, Nailsea, 7 October - a distinctive bug which occurs on the leaves of floating water plants. Although not common, it is probably overlooked and this is the seventh locality for V-c 6.

Notonecta maculata Fab. Two in cattle trough, Freshford, 26 August.

Sigara semistriata Fieb. Several in rhine, Godney Moor, nr Godney, 7 July.

GRASSHOPPERS & CRICKETS (*Orthoptera*) by K.W. Miller

The hot dry summer made it a good year for grasshoppers and crickets although, surprisingly, fewer records were received; six in all but making up perhaps in quality what they lacked in quantity. For next year's Report may we also have records of the commoner species as well as the more local ones?

Gomphocerippus rufus (Rufous Grasshopper) Recorded from Draycott, Mendip, 18 August (RSC). This species occurs on limestone, but usually on oolite or liassic rather than on carboniferous where it seems to be rare.

Stethophyma grossum (Large Marsh Grasshopper) Reported again from its known habitat on the STNC Reserve, Westhay Moor, 19 August (RSC).

Acheta domesticus (House-cricket) One, possibly more, in pigsty, Banwell, 21 August and one singing from a crevice in wall, Beach Lawns, Weston-super-Mare on 27th, same month (RSC). This species is not native to Britain but was introduced centuries ago, and like the common cockroach which probably arrived at the same time, surviving in houses, bakeries, restaurants etc. Also it is found in coal mines and commonly in rubbish dumps from where it was recorded just south of Clevedon in 1976. The House-cricket probably originated in the dry areas of north Africa and south-west Asia where they still exist today. During hot summers such as we have had recently this cricket may wander some distance from its usual haunts (Ragge, 1965).

TRUE FLIES (*Diptera*) by R.H. Poulding

Ten observers contributed over 100 record cards with about half relating to hover flies (*Syrphidae*); ten other families were represented with horse-flies (*Tabanidae*) the second most recorded family. This large and welcome rise in the records received for 1984 from our enlarged recording area was due to an increased interest in hover flies, stimulated by the general availability of an excellent identification key for syrphids with many illustrations in colour (Stubbs & Falk, 1983). As in previous Reports, the majority of the records selected refer to uncommon or under-recorded species but, because of additional information on the syrphids, it has been possible to comment on the population levels of some species or genera of this family.

Scientific names and order of species are in accordance with Kloet & Hincks, *A Check List of British Insects*, Vol. XI, Pt. 5, 2nd ed, 1976, with the exception of the *Syrphidae* for which the check list given in Stubbs & Falk, 1983 has been followed.

Bibionidae (St Mark's Flies)

Bibio reticulatus Shapwick Heath, nr Shapwick, 26 April (RMP) - only two records given by Audcent (1948) but is generally regarded as a common spring species like *B. johannis* and the larger *B. marci* (Colyer & Hammond, 1968).

Stratiomyidae (Soldier Flies)

Pachygaster leachii Female, garden hedge, East Harptree, 6 July (RMP). This is a small blackish species found chiefly on oak but is infrequently recorded locally.

Nemotelus notatus Swept from low vegetation around reed bed, Littleton Brick Pits, AWT Reserve, 15 July (RHP).

Stratiomys furcata Several on umbels, Westhay Heath, nr Westhay, 10 August (RHP). This large soldier fly inhabitats marshes and although a local species it can be frequent in certain localities.

Asilidae (Robber-flies)

Asilus crabroniformis Female, Weston Moor, nr Walton-in-Gordano, 9 September (NM). This is the first record received for the district for this Report since its commencement in 1977. Audcent (1948) cites thirteen records including one from Clevedon and another from Tickenham not far from the above locality. *A. crabroniformis* is undoubtedly a very scarce local species although despite its large size - it is the largest British fly - can be easily missed. It remains motionless for long periods on stones or cow dung waiting to capture passing insects by short rapid flights or capture darts. Its prey consists mainly of the larger *Diptera* but can include grasshoppers and even large, well armoured beetles.

Tananidae (Horse-flies)

Chrysops viduatus Male, Shapwick Heath NNR, 10 August (JEH, RHP) - less common than *C. caucutiens* and *C. relictus* in the district.

Hybromita bimaculata Recently emerged female, edge of reed bed, Littleton Brick Pits, 15 July (AWT survey).

Dolichopodidae

Medeterus tristis On birch trunk, Shapwick Heath, nr Shapwick, 26 April (RMP) - an uncommon dolichopodid, less than 3 mm in length, found on tree trunks.

Machaerium maritimae Several on vehicle, car park, Littleton Brick Pits, 15 July (RHP). This local estuarine species has been recorded at Aust and at Burnham-on-Sea (Audcent, 1948) and is noted by d'Assis Fonseca (1978) as occurring in Gloucestershire and Somerset.

Syrphidae (Hover Flies)

Although many species were recorded, the population levels of some of the commoner species were obviously low as compared with an average year. Of the hover flies found regularly in gardens *Syrphini* species such as *Syrphus ribesii, S. vitripennis* and *Metasyrphus corollae, M. luniger* were unusually scarce until late July and early August. The usually very common wasp-mimic *S. ribesii* was not reported as common until mid-August. There was no obvious dearth of aphids, the normal larval food of *Syrphus* and *Metasyrphus* spp., during the late spring and summer and it seems likely that there was a low spring population of adults derived from overwintering pupae resulting in a poor first brood. Similarly, but for different reasons, *Eristalini* spp., particularly *Eristalis tenax, Eoseristalis arbustorum, E. nemorum* and *E. pertinax,* whose larvae feed in water-filled or damp sites, were much reduced in numbers throughout their normal season from early spring to late autumn. The explanation for this is most probably two disastrous breeding seasons in succession: the 1983 and 1984 summer droughts reduced available water-logged breeding sites, drying-up muddy pools, rhines, wet holes in trees etc.

Platycheirus fulviventris Frequent, Littleton Brick Pits, several dates, June and July (RHP, SR) - a local species found in marshy habitats with a preference for coastal sites.

P. tarsalis Two females, Leigh Woods NNR, nr Bristol, 13 May (SR).

Metasyrphus latilunulatus Single male, edge of oak wood, Barrow Gurney, 29 May (SR). Only two previous records cited by Audcent (1949). Apparently a rare species but probably males are confused with *M. luniger* which they closely resemble, and females with *M. latifasciatus*, both frequent or common species (Stubbs & Falk, 1983).

Xanthogramma pedissequum Male in garden, St Andrews, Bristol, 23 June (SR).

Cheilosia scutellata Male, Leigh Woods NNR, nr Bristol, 15 July (SR) - a woodland species whose larvae have been found in fungi. Although considered a fairly common species in southern England, there are few recent records in the recording area for this *Cheilosia*. It was not recorded for the Forestry Commission part of Leigh Woods during the recent survey.

Orthonevra geniculata Female on birch trunk, Shapwick Heath, nr Shapwick, 26 April (RMP) - an uncommon species confined to marshes and fens. Not recorded by Audcent (1949) for the district.

Anasimyia contracta Male on Bulrush (*Typha* sp.), edge of pond, Charterhouse, 30 June (Ent. Sect. field meeting).

Eumerus ornatus Male, Leigh Woods NNR, nr Bristol, 23 June (SR). This was the only record received for this Lesser Bulb Fly whilst the closely related *E. tuberculata* was exceptionally common in gardens during 1984.

Pipizella virens Barrow Wood, Barrow Gurney, 31 July (SR) - regarded as a scarce and local species by Stubbs & Falk, 1983 but noted as very common by Audcent (1949) for the district. *P. varipes*, a similar but commoner species, was not always separated from *P. virens* at the time of Audcent's list. The present status of the three species of *Pipizella* in the recording area is uncertain and additional observations of this under-recorded genus would be of value.

Volucella inflata Male on Hogweed flowers, Blaise Castle, Bristol, 24 June (SR) and female on Bramble,blossom, Lime Breach Wood AWT Reserve, 3 August (SR).

V. zonaria One on wall, Clifton, Bristol, 10 June (NM) and female in garden, Henleaze, Bristol, 11 August (RHP).

Tropidia scita Several males, various dates, Littleton Brick Pits AWT Reserve (RHP, SR). This appears to be the first published record of this species in V-c 34 part of the recording area. It is restricted mainly to marshy areas and has recently been reported from Congresbury and Shapwick NNR in V-c 6.

Tephritidae (Gall-flies)

Urophora cardui Reared from stem galls of thistles collected at Middle Hope, nr Weston-super-Mare (EAFD, RHP).

U. solstitialis On flowers of Musk Thistle (*Carduus nutans*), Middle Hope, nr Weston-super-Mare, 14 July (RMP).

Muscidae

Two interesting species of this family associated with cattle found during a national survey:-

Trichopticoides decolor Female on cow, East Harptree, 6 August (RMP) - an uncommon species recorded twice by Audcent (1949) for the district.

Hydrotaea albipuncta Female on cow, East Harptree, 6 August (RMP). This species is apparently widespread in Britain but often difficult to detect as it normally inhabitats the corner of the eye in cattle.

SAWFLIES, BEES, WASPS, ANTS ETC. (*Hymenoptera*) by R.M. Payne

Symphyta (Sawflies)

This is a very neglected group of relatively large insects and there must be very many species in our area which have not yet been recorded. The following are the more interesting records I have made in 1984:-

Empria liturata Gmelin. Pair in water trap in my garden, East Harptree, 20 April.

Tenthredo marginella F. Female on Fennel flowers in my garden, 17 August.

T. schaefferi Klug. Female, indoors, East Harptree, 20 August.

Macrophya albicincta Schrank Male, Midger Wood, Lower Kilcott, 19 May.

Aculeata (Bees, Wasps and Ants)

These insects are in general better known than the Sawflies, but in recent years many new species have been added to the British list, some of them based on microscopic characters, so that it is often necessary for specimens to be examined critically before a determination can be made.

Formica rufa L. Hanham, Bristol (RSC). This large Wood Ant used to be fairly common particularly in the southern part of our area but there have been few recent records. Members are invited to look for the large mound nests in woodland, and to let me know of any sightings.

Ancistrocerus nigricornis Curtis This yellow and black Solitary Wasp was taken in my garden at East Harptree, 31 July.

Symmorphus gracilis Brullé A female of this Solitary Wasp was at Figwort flowers, East Harptree, 11 July.

S. mutinensis Baldini Female, indoors, East Harptree, 5 July.

Crossocerus megacephalus Rossius Female of this Sand Wasp taken indoors, East Harptree, 7 July.

Ectemnius cephalotes Olivier Male of this Sand Wasp sunning itself on Beech leaf in my garden, 27 July.

Andrena haemmorhoa F. Pair of these Mining Bees in water trap in my garden, 22 April.

A. jacobi Perkins Female in my garden, 27 April and another indoors, Congresbury, 7 May (RWR).

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BRISTOL BOTANY IN 1984

by A.J. WILLIS

(Department of Botany, University of Sheffield)

Overall the year 1984 throughout the United Kingdom was warm, sunny and with distinct wet and dry spells, this pattern being followed closely in the Bristol area. At Long Ashton Research Station, to which all meteorological records relate, the temperature averaged 0.4°C above the 50-year mean, sunshine hours were 111% of average and rainfall for the year was 910.8 mm, 104% of average.

January was the wettest month, with 157.5 mm of rain, but February, March and a very sunny April were progressively drier, the extremely low figure of 3.3 mm of rain being recorded in April, only 6% of average. February and especially March were colder than usual and spring flowering tended to be late. May was also rather cold and wet, but the summer was hot, dry and sunny, with above average temperatures and sunshine hours in June, July and August and below average rainfall in these three months. Records of orchids flowering in June and July were of considerably smaller numbers as compared with the very good year of 1983. For example, some 660 flowering spikes of *Anacamptis pyramidalis* were noted on Hursley Hill in early July, compared with approaching 2000 at the end of June in 1983; however, 660 is a minimal count as some flowers were over. About 500 flowering spikes of *Ophrys apifera* were noted at Aust, compared with c.1800 in 1983 (P.J. Chadwick). On the other hand, conditions during 1984 appear to have been favourable for *Vicia bithynica* which performed well and for *Crepis biennis* which was more evident in the Bristol area than formerly. September was warm and wet, and although the last three months of the year were also mild, rainfall in the autumn and early winter helped to restore the deficit generated in the summer. The flowering, in some quantity, of *Potentilla tabernaemontani* on Shute Shelve Hill a few days before Christmas (RSC) may be a reflection of the mild autumn and early winter.

A number of interesting records were made in 1984. Among the more notable is a second locality in V-c 6 for *Sorbus* x *vagensis* and an extension of the range of *S. eminens* to Tickenham and King's Wood, Yatton. The occurrence of *Hippophaë rhamnoides* on the banks of the Severn near Oldbury represents a considerable extension of the range of this shrub, but it remains to be seen whether it establishes here. *Crithmum maritimum* appears to be establishing in this locality, albeit in a man-made habitat. In contrast, *Artemisia maritima* seems to be becoming rarer along the banks of the Severn. On the Somerset coast, the occurrence of *Althaea officinalis* at Kingston Seymour is notable and represents a wider distribution. Furthermore, the substantial re-establishment of *Limonium binervosum* at Stert Island provides an interesting example of the changing success of species in particular sites.

In recent years records have been often made indicating the persistence of species in localities from which they have not been reported for some years. In this category in 1984 may be mentioned *Tulipa sylvestris* at Dunkerton, *Polygonatum odoratum* in old woodland near Cleeve and *Cystopteris fragilis* which had been feared lost from Leigh Woods. The continued existence of *Oenanthe pimpinelloides* at Chewton Keynsham, and of the often overlooked *Bupleurum tenuissimum* on the banks of the Yeo and at Berkeley, has also been noted in 1984. Of particular interest is the persistence of *Rosa rubiginosa* and also *R. micrantha* at Walton-in-Gordano, localities from which these Roses were known earlier this century, but there are no more recent records for this area. Reports are given in this article of a number of the *Taraxaca* of the Avon Gorge area, including one taxon (*T. pseudolamprophyllum*) which is not yet described in the literature.

On the weekend of 28-29 July Mr P.J.M. Nethercott led meetings to Mangotsfield and to Clifton and Durdham Downs in remembrance of the 350th anniversary of the visit to these places by Thomas Johnson, a London apothecary, and his friends. The itinerary of their thirteen days journey and the plants seen on it are recorded in Johnson's *Mercurius Botanicus*, 1634. As most of the plants would have been seen many times Johnson recorded localities for the unusual ones only. For Mangotsfield, where his host was Philip Langley, the then owner of the Manor House facing on to Rodway Hill, Johnson recorded the Wall Pennywort 'upon the walls' there and the Lesser Burdock in his host's yard. Disappointingly, no Wall Pennywort could be shown on the meeting as the plant could not be found anywhere in Mangotsfield or in other places near where it used to grow. Lesser Burdock is hardly an uncommon plant but recording it on Langley's property might have been a compliment by Johnson to his host. Regrettably this plant likewise could not be found within reasonable proximity to the House. For the Avon Gorge, explored the next day, Johnson had recorded Tutsan, Wall Rue, Wild Madder, Honewort, Bloody Cranesbill and Asparagus. This Society's members were able to see the Wall Rue, Wild Madder and Honewort at Clifton but safety considerations prevented going to a Cranesbill site. Tutsan and Asparagus could only have conveniently been seen on the other side of the Avon, but time precluded a visit. Members did, however, see the Spiked Speedwell, not observed by Johnson but reported to him by his friend John Goodyer of Hampshire after a visit in 1638 and included by Johnson in his *Mercurii Botanici, pars altera*, 1641 (PJMN). J.W. White (*The Flora of Bristol*, 1912, pp. 53 *et seq.*) refers to Thomas Johnson as the most interesting figure of the seventeenth century to the Bristol botanist; among the species which Johnson added to the British flora were a number from the Bath and Bristol area including *Cardamine impatiens* and *Ornithogalum pyrenaicum*.

A paper by D.H. Brown and J.W. Bates in these PROCEEDINGS for 1983 (Vol. 43, pp. 29-46) entitled 'The distribution of some common lichens in the Bristol region' gives information on the distribution of 34 taxa of lichens. These lichens are mapped for the Bristol area and factors controlling their distribution are considered. The abundance of *Lecanora conizaeoides* throughout the area is interpreted as indicating atmospheric pollution affecting the whole region. Nevertheless, some fairly pollution-sensitive species are present close to the southern boundary of Bristol, but the lichen flora is impoverished north of the River Avon.

The Flora of Avon project is now well under way, with recorders covering most of the county. The first meeting of recorders was held in July 1984 in the Bristol Regional Environmental Records Centre, City of Bristol Museum and Art Gallery. Julian Scott is the BRERC Supervisor.

Names of contributors associated with several records, or with the determination of specimens, are abbreviated thus:

AJB	A.J. Byfield	CK	Mrs C. Kitchen
RSC	R.S. Cropper	MARK	M.A.R. Kitchen
TGE	T.G. Evans	CML	Dr C.M. Lovatt
RF	Lady Rosemary FitzGerald	PJMN	P.J.M. Nethercott
IFG	Miss I.F. Gravestock	RMP	R.M. Payne
DEG	D.E. Green	AJR	Dr A.J. Richards
ALG	A.L. Grenfell	JS	J. Scott

G: Gloucestershire S: Somerset

BRISTOL BOTANY IN 1984

For details of the area covered by this Report, see 'Bristol Botany in 1978', p. 35.

Blechnum spicant (L.) Roth A robust plant in the wooded south fringe of the Gully, Clifton Down, Bristol, G, PJMN. Present from 1953 to 1956, it bore fertile fronds in 1955 but was subsequently trampled upon and disappeared, PJMN. Persistent in Stoke Lane Valley, Edford, S, RSC, where a few plants in woodland. Also two plants near wood border, Cheddar Gorge, S, RSC.

Cystopteris fragilis (L.) Bernh. On soil in the northern part of Leigh Woods, Bristol, S, CML. Also previously independently found on old wall in Leigh Woods, AJB. White (1912) doubted whether this fern persisted in Leigh Woods, but it was known here in two localities by H.J. Gibbons and Miss I.M. Roper (note by N.Y. Sandwith in his card index). It was also found by Dr R.M. Harley in 1966 near the bottom of Nightingale Valley after some earth removals were effected, and was seen there by PJMN and others. However, because of trampling it did not persist, PJMN. This fern is also still at Dundry, S, RSC.

Polystichum aculeatum (L.) Roth A few plants on bank in larch plantation, Ball Wood, Cleeve, S, RF.

Phegopteris connectilis (Michx) Watt The Beech Fern, previously known as *Thelypteris phegopteris* (L.) Slosson, is noted in R.G.B. Roe's *Flora of Somerset* (p. 18) as formerly near Wells, S, but not reported from there since 1884. In the card index of N.Y. Sandwith (and in his handwriting) is the following note regarding the locality near Wells - 'Still in the Wells locality up to 1918, Roper ms. (and White ms.). The wood was felled and the habitat dried up'. The first record for this fern in Leigh Woods is in 1951 (see 'Bristol Botany in 1952', p. 312) (rather than 1957 as given in the *Flora of Somerset*), but regrettably the fern now seems to be lost from this site, as indicated in 'Bristol Botany in 1977', p. 16.

Ophioglossum vulgatum L. ssp. *vulgatum* In 1982, about 200 plants, north of Stokeleigh Camp, Leigh Woods, Bristol, AJB & CML. Noted by White (1912) at this site. Also in rough grass (1984) on bank near road, Ashton Hill, Bristol, S, RF; previously known in this vicinity.

Ranunculus lingua L. A small flowering patch, Priddy Pool, S, RSC. Certainly a recent arrival here.

Berberis vulgaris L. Hedgebank, Bevington, G, CK & MARK.

Ceratophyllum demersum L. In shallow pool at margin of dried-up reservoir, Chew Valley Lake, West Harptree, S, RMP & RSC.

Papaver lecoqii Lamotte Several plants in ruts in cart track, Blagdon Lake, S, RMP.

Fumaria densiflora DC. Twenty plants in leek bed, market gardens, Bromley Heath, Downend, G, ALG. Last noted in 1977.

Cardamine bulbifera (L.) Crantz A colony of about 150 plants in a wooded strip adjoining bridle path, Bannerdown, Batheaston, S, DEG. Possibly introduced into the site from Smallcombe Wood.

Rorippa palustris (L.) Bess. Very plentiful in dried-up bed of reservoirs, Blagdon Lake, S, and Chew Valley Lake, S, RMP. Much more abundant than *R. sylvestris* (L.) Bess. in both localities.

Hypericum androsaemum L. Henton, S, RSC.

Silene noctiflora L. On spoil from flood protection, Sheperdine, G, CK & MARK.

Cerastium semidecandrum L. Still at Observatory Hill, Bristol, G, and also Weston-super-Mare, S, RSC.

Myosoton aquaticum (L.) Moench In damp place near stream close to the abandoned railway station, Mangotsfield, G, PJMN.

Sagina nodosa (L.) Fenzl Several plants on eastern rampart, Dolebury Warren, S, RMP.

Tilia cordata Mill. In 1983, some twenty well-grown trees (up to about 60 ft), in two large circles, perhaps from a parent tree in each place, on Oolitic limestone, Cleaves Wood, Norton St Philip, S, DEG. Although this tree is well known on Carboniferous limestone, it is not common elsewhere, but clearly has been long established in Cleaves Wood.

Malva neglecta Wallr. One fine plant on disturbed ground, Westhay Moor, Somerset Levels, S, RSC. Also *Galeopsis tetrahit* L.

Althaea officinalis L. Two large clumps and a smaller patch on landward side of sea wall, Kingston Seymour, S, RSC. This represents a welcome extension of its range on the Somerset coast, in a site where extensive reconstruction of the sea wall is being undertaken. However, flood prevention work at Hills Flats, G, CK & MARK, may threaten plants at this site at the edge of saltmarsh.

Geranium robertianum L. A white-flowered form, by path, Stoke Bishop, Bristol, G, IFG. Also in Stoke Bishop, *Silaum silaus* (L.) Schinz & Thell. (marsh near railway line) and *Melissa officinalis* L.

Trifolium squamosum L. Very plentiful on landward side of sea bank, Wick St Lawrence, S, RSC, and persistent on banks of the River Axe, S. *Torilis nodosa* (L.) Gaertn. also in both of these areas.

T. scabrum L. At several sites by sea wall, near Sheperdine, G, CK & MARK.

T. micranthum Viv. In sparse turf, Battery Point, Portishead, S, A.C. Titchen.

Vicia bithynica (L.) L. Performed very well in 1984 at the Winterbourne/ Stoke Gifford site, G, forming over 90% of the 'visible ground vegetation' in a patch of some 100 m^2. The entry in 'Bristol Botany in 1981' should read Winterbourne and Stoke Gifford; the road represents the parish boundary here. This uncommon vetch has also been found in hedgerows and field borders in the vicinity. Substantial seed germination was noted in October. The plant was not seen at Earthcott Green (see 'Bristol Botany in 1983') in 1984, where road works have affected the verges, but five plants were located in a third site, about a half a mile to the south, on a roadside bank at Frogland Cross, G, ALG.

Lathyrus sylvestris L. Very plentiful on edges by former rail tracks, in area of abandoned railway station and track, Mangotsfield, G, PJMN.

Rosa rubiginosa L. On golf course, Walton-in-Gordano, S, PJMN. Recorded as widely distributed in this area by White (*The Flora of Bristol*, 1912, p. 293) under *R. Eglanteria* L. but noted by Captain R.G.B. Roe (*The Flora of Somerset*, 1981, p. 107) as reliably recorded recently only from Tickenham Hill in this general area.

R. micrantha Borrer ex Sm. Lane near golf course, Walton-in-Gordano, S, PJMN. Recorded by White (1912, p. 293) as plentiful from Walton Castle Hill but noted by Captain Roe (*The Flora of Somerset*, 1981, p. 107) as not recorded recently in V-c 6 except at Cheddar.

Sorbus eminens E.F. Warb. A solitary shrub, Tickenham, near Cadbury Camp, S, PJMN, where first noticed in 1980. Also two coppiced trees in King's Wood, near Yatton, S, R.G.B. Roe, conf. PJMN. The specimens from these two localities are not distinguishable from shrubs in the Avon Gorge, so these extensions of the range of *S. eminens* must be accepted, PJMN.

Round-leaved *Sorbi* on both sides of the S.W. end of the Cheddar Gorge which resemble shrubs of *S. eminens* were considered by the late Dr E.F. Warburg (who was shown fresh leaves and fruit by PJMN) not to be this species. A distinct taxon may be involved here.

S. x *vagensis* Wilmott At least two coppiced specimens, well separated, King's Wood, Yatton, S, PJMN. Although conifers have been extensively planted in the Congresbury-Yatton woods, some areas are relatively undisturbed. In the old woodland King's Wood, very variable *S. aria* (L.) Crantz is found, as well as *S. torminalis* (L.) Crantz; the ground flora includes *Lithospermum purpurocaeruleum* L., PJMN.

King's Wood is a second North Somerset locality for *S.* x *vagensis*, which has previously been recorded from Weston Big Wood. This hybrid between *S. aria* and *S. torminalis* is also referred to under *S. confusa* Gremli ex Rouy & Camus.

Hippophaë rhamnoides L. A single plant on bank of estuary, Oldbury-upon-Severn, G, CK & MARK. If the record made by Rev Thomas Lawson from 'Red Cliff' (see 'Bristol Botany in 1950', p. 175) is discounted, the present report appears to be the first record for W. Gloucester, V-c 34. The nearest substantial population of *H. rhamnoides* to the Oldbury locality is at Berrow; possibly the plant is bird-sown from this site. It will be of interest to follow the growth and perhaps spread of the plant.

Epilobium roseum Schreb. Several plants in damp gutter outside old cottages, East Harptree, S, RMP.

Bupleurum tenuissimum L. In quantity landward of sea bank, Wick St Lawrence, S, RSC, and still present at the mouth of the River Yeo. Also persistent, with *Trifolium fragiferum* L., on saltmarsh at Berkeley, G, CK & MARK.

Petroselinum segetum (L.) Koch In quantity on verge of roundabout, where probably introduced with imported top-soil, Hambrook, G, ALG. Two plants on sea wall, Hills Flats, G, RF & MARK; it was reported from Sheperdine in 1957. Flowering and fruiting on disturbed ground by road, West Huntspill, S, RSC.

Sison amomum L. In rhine near old railway line, Congresbury, S, IFG. Also by the railway line *Chenopodium bonus-henricus* L., *Malus sylvestris* Mill. ssp. *mitis* (Wallr.) Mansf., *Pastinaca sativa* L. and *Agropyron* (*Elymus*) *repens* (L.) Beauv. var. *aristatum* Baumg.

Crithmum maritimum L. Several plants on estuary wall, West Ham Corner, near Oldbury-on-Severn, G, CK & MARK. This appears to be a first record for this part of the estuary, although the plant has been reported for New Passage and for the New Grounds (see H.J. Riddelsdell *et al.*, *Flora of Gloucestershire*, 1948, pp. 238-9).

Oenanthe pimpinelloides L. Wooscombe Bottom, Chewton Keynsham, S, IFG, det.

ALG. Reported by White (1912) from this area, and known to the Sandwiths here in 1920.

Euphorbia platyphyllos L. Still at Beckington, S, DEG where Dr H.F. Parsons collected a specimen in 1868. This Spurge is a very rare plant in the northern parts of Somerset.

Rumex acetosella L. s. str. Fairly numerous scattered plants in 1983, but fewer in 1984, Gallery roof below Suspension Bridge, Avon Gorge, G, CML. White (1912) indicated the plant as plentiful about St Vincent's Rocks.

R. maritimus L. With *Bidens tripartita* L., still at Hill, G, CK & MARK. Persistent at Westhay Heath, where several very fine plants in flower and fruit, S, RSC. This Dock was reported by J.O. Mountford from Queen's Sedge Moor, S, in 'Bristol Botany in 1982', p. 103, based on a visit to the site in early July. As Captain R.G.B. Roe (pers. comm.) had no other records from this area he subsequently investigated the situation further, finding the plants to be *R. palustris* Sm. While the two species may be confused early in the season, at a late stage (September) they are much more easily distinguished. Both species grow together at Shapwick and at Westhay.

Limonium binervosum (G.E. Sm.) C.E. Salmon Hundreds of fine plants on meddy sand, Stert Island, S, RSC. Recorded here in 1902 by Dr C.E. Moss, but the present colony is known to be developed since 1976. Other recent arrivals include *Armeria maritima* (Mill.) Willd. and *Crithmum maritimum* L. On the other hand, known patches of *Halimione portulacoides* (L.) Aellen and of *Limonium vulgare* Mill. have apparently disappeared, RSC.

Primula x *tommasinii* Gren. & Godron (*P. veris* L. x *vulgaris* Huds.) Two vigorous plants, Brent Knoll, S, RSC. Also a good patch of *Lamium purpureum* L. with pure white flowers, growing with normal coloured plants.

Samolus valerandi L. A single flowering plant on muddy bank formed by scooping out to make a new lagoon for birds, Chew Valley Lake, S, RMP. This record is of particular interest as the locality is a considerable distance from the sea, and the plant has not been known so far from the sea in North Somerset for very many years. C.C. Babington's *Flora Bathoniensis* (1834) reports it as frequent in watery places near Bath, but this statement is doubted as Rev L. Jenyns in a lecture in 1866 on the Bath flora noted *S. valerandi* as decidedly rare (*Proceedings of the Bath Natural History and Antiquarian Field Club*, Vol. 1, 1867-9, pp. 25-63). The plant was, however, recorded by C.E. Salmon for Nempnett (Thrubwell), some two miles west of Chew Valley Lake, prior to 1914 (E.S. Marshall, *A Supplement to the Flora of Somerset*, 1914, p. 120).

Cuscuta europaea L. Two patches along the River Avon at Swineford, S, RSC.

Linaria vulgaris Mill. A few plants with flowers uniformly yellow and lacking the dark orange palate, along abandoned railway track near the old Mangotsfield Station, G, PJMN. Druce (*Flora of Oxfordshire*, 2nd edn, 1927, p. 308) records this form and notes the considerable range of variation shown by this plant.

Veronica anagallis-aquatica L. Rare on dried-up bed of reservoir, Chew Valley Lake, S, RMP. Much the commonest *Veronica* here was *V. catenata* Pennell, which was also common on the damper parts of the dried-up bed of Blagdon Lake, S, RMP.

V. agrestis L. Garden weed, East Harptree, S, RMP.

Asperula cynanchica L. Near Priddy, S, RSC.

Dipsacus pilosus L. Several plants on bank of River Avon at Freshford, S, RSC.

Bidens cernua L. Very local, Chew Valley Lake, S, RMP & RSC, together with abundant *B. tripartita* L. The latter also at Freshford, S, RSC.

Senecio sylvaticus L. On bare ground at lake margin, Chew Valley Lake, S, RMP.

Filago germanica (L.) L. Several flowering and fruiting plants on bare, stony slope above Draycott, S, RSC. This species was once frequent but is now rather rare in Somerset.

Anthemis cotula L. A small colony at margin of ploughed field, Stowey, S, RMP. This weed species is not common in North Somerset.

Artemisia absinthium L. Marsh, Sand Bay, S, IFG. Also at Sand Bay *Ononis spinosa* L. and *Pyrus communis* L.

A. maritima L. One small patch at foot of seawall, Sheperdine, G, CK & MARK. This plant seems now to be very scarce on the shoreline north of the River Avon.

Onopordum acanthium L. Several plants on waste ground and rough grazing where clay has been dumped, near Court House Farm, Easton-in-Gordano, S, RF.

Crepis biennis L. Bank near railway south of Nailsea, S; roadside, Flax Bourton, S; and Rhodyate Hill, S, RF. This plant, for which records are not very numerous, appeared to have a good year in 1984. It has previously been reported from Nailsea but from another site.

Taraxacum Sect. *Erythrosperma*

T. lacistophyllum (Dahlst.) Raunk. Bottom of Great Quarry, Avon Gorge, G, CML, det. AJR.

T. oxoniense Dahlst. St Vincent's Rocks, Observatory Hill and the Gully, Avon Gorge, G, CML, det. AJR.

Taraxacum Sect. *Hamata* H. Øllg.

T. atactum Sahlin & Van Soest In 1981, towpath below Leigh Woods, Bristol, S, CML, conf. C.C. Haworth. A first record for V-c 6. Also four specimens from the St Vincent's Rocks area, Avon Gorge, G, 1979, CML, det. AJR.

T. pseudohamatum Dahlst. In 1979, Observatory, Avon Gorge, G, CML, det. AJR. A first record for V-c 34.

T. pseudolamprophyllum inedit. In 1982, edge of towpath, by R. Avon under Leigh Woods, Bristol, S, TGE, det. C.C. Haworth, H. Øllgaard *et al.* This taxon has yet to be described in the literature, but appears to be an endemic with its focus of distribution around South Wales (C.C. Haworth).

Taraxacum Sect. *Taraxacum* (*Vulgaria*)

T. expallidiforme Dahlst. In 1979, Observatory, Avon Gorge, G, CML, det. AJR.

T. stenacrum Dahlst. In 1979, Zigzag, Avon Gorge, G, CML, det. AJR. New to V-c 34.

T. ekmanii Dahlst. Further examination of the specimen from the towpath below Leigh Woods, Bristol, S, reported in 'Bristol Botany in 1982', has eliminated this record, TGE.

Potamogeton natans L. In the Kennet & Avon Canal at Bathwick, S, and at Claverton, S, RSC.

P. berchtoldii Fieb. Two places in Chew Valley Lake, S, RSC. Also here *P. pectinatus* L. and in the canal at Claverton, S, RSC.

Zannichellia palustris L. In fruit, in shallow pool, Chew Valley Lake, S, RMP, det. RSC. Also fruiting at Wick St Lawrence, S, RSC. With *Ranunculus baudotii* Godr., in recently constructed pool behind sea wall, Kingston Seymour, S, RSC.

Polygonatum odoratum (Mill.) Druce A patch on crest of limestone crag, Ball Wood, Cleeve, S, CK, MARK and, later, RF. Previously (1919) reported by White from 'woods east of Rhodyate Hill'. Ball Wood is a high quality ancient woodland with yew, *Sorbus aria*, *S. aucuparia*, *S. torminalis* and *Tilia cordata*, RF, and the persistence of the rare Solomon's Seal in this area of limestone woodland is much welcomed.

Ruscus aculeatus L. Many small bushes on bank, Easter Compton, G, CK & MARK.

Juncus compressus Jacq. Many large clumps at margins of Chew Valley Lake, S, RSC. This rush has previously been recorded for Blagdon Lake but is rare in Somerset.

J. acutiflorus Ehrh. ex Hoffm. In 1983, with planted *Leucojum aestivum* L., newly made pond, South Stoke, S, DEG.

Allium oleraceum L. In good quantity on raised bank of River Avon, between Pill and Royal Portbury Dock, S, RSC. Also hundreds of plants by footpath, Abbots Leigh, S, RF, where known since 1972.

Ophrys apifera Huds. A single flowering plant, track, Stock Hill Plantation, Priddy, S, RSC.

Lemna gibba L. With *Spirodela polyrhiza* (L.) Schleid., new reservoir, Midford, S, DEG. These Duckweeds have not been often recorded away from the Somerset Levels and the main marshlands and canals.

Sparganium erectum L. Brook, Redland, Bristol, G, IFG.

Cyperus longus L. Four large clumps, planted at edge of pond, Marshfield, G, DEG. Formerly planted at Henbury.

x *Festulolium holmbergii* (Dörfl.) P. Fourn. A single tussock of this hybrid between *Festuca arundinacea* Schreb. and *Lolium perenne* L., on towpath wall, near Suspension Bridge, Avon Gorge, S, ALG & CML, conf. P.J.O. Trist. Previously (1955) reported from this locality.

Poa angustifolia L. Abundant on roadside verge, Frogland Cross, Frampton Cotterell, G, and on bridge over motorway, Almondsbury, G, ALG.

Agrostis gigantea Roth Near station, Sea Mills, Bristol, G, IFG.

ALIENS. *Nigella damascena* L. Several plants in layby near quarry, Chipping Sodbury, G, CK & MARK.

Rapistrum rugosum (L.) All. A few fine plants in flower and fruit near footpath, Burnham-on-Sea, S, RSC.

Erysimum cheiranthoides L. Weed of arable fields, East Harptree, S, Hinton Blewett, S, and abundant at Bishop Sutton, S, RMP.

Amaranthus retroflexus L. Several large plants, pavement, Downend, G, ALG.

Chenopodium bonus-henricus L. Several large clumps along walls, West End Farm, Nailsea, S, RF.

C. hybridum L. A single plant, Brislington Tip, S, ALG & JS.

Phaseolus coccineus L. In flower and fruit on demolition site, Redfield, Bristol, G, ALG. This plant seldom lasts beyond the seedling stage in the wild in Britain. Also in the site was *Citrullus lanatus* (Thunb.) Mansfeld.

Pyracantha rogersiana (A.B. Jacks.) Bean One large bush, the yellow-fruited cv. 'flava', St Philips Marsh, Bristol, G, ALG.

Pyrus pyraster Burgsd. Several trees in hedge, near Rockhampton, G, CK & MARK. Reported in this locality by Miss I.M. Roper (1915).

Heracleum mantegazzianum Somm. & Levier By Nunney Brook, S, IFG.

Cannabis sativa L. A single fine plant (male) on central reservation of motorway, Stapleton, G, ALG.

Lysimachia punctata L. A small colony on wayside green, Goose Green Road, near Siston Common, Mangotsfield, G, PJMN.

Solanum rostratum Dunal A few plants on waste ground, Clutton, S, R.A. Janes, det. RMP. Also garden weed, almost certainly arising from bird-seed, Stanton Drew, S, R.A. Janes, det. RMP.

Datura stramonium L. Two plants, waste ground, Thornbury, G, CK & MARK.

Acanthus mollis L. Long established in lane, Stoke Bishop, Bristol, G, IFG. Also in Stoke Bishop *Lycium chinense* Mill., *Cicerbita macrophylla* (Willd.) Wallr. and *Allium roseum* L. (well-established in dense undergrowth).

Tragopogon porrifolius L. Persistent near sea-wall, Severn House Farm, near Ham, G, CK & MARK. The Salsify was first recorded here in 1978 as 'one plant in rough herbage' by Mrs D. Rumsby and Mrs E.L. Sell (*J. Glos. Nat. Soc.*, 30, p. 167); its origin was suggested as 'probably a garden outcast'. In 'Bristol Botany in 1979' (p. 63) a number of plants were reported, thought to represent a fairly recent arrival (PJMN). Some 40 plants were recorded at the site in 1980 by ALG (*J. Glos. Nat. Soc.*, 32, p. 15), who now questions its origin as a garden outcast and suggests that the plant may have been little noticed previously as it is easily confused with *T. pratensis* L. when the flowers are closed in the afternoon, and it is in a site where the herbage is customarily cut in mid-July.

Tulipa sylvestris L. Over 200 plants and two flowering heads, Dunkerton, S, DEG (also seen by Captain R.G.B. Roe). The locality agrees well with that indicated by White (*The Flora of Bristol*, 1912, p. 583). This is a welcome indication of the persistence of the plant, especially as repeated searches in the Combe Hay area by Dr D.E. Coombe in 1944 were unsuccessful. Sparse flowering is a well-known characteristic of this tulip in the wild.

Juncus tenuis Willd. Several plants at edge of track, Black Down, Mendip, S, RMP.

Bromus inermis Leyss. A large clump, flowering in late September, near Parkway Station, Stoke Gifford, G, ALG.

Setaria viridis (L.) Beauv. On dumped soil, Odd Down, Bath, S, DEG, det. ALG. A second record for the area.

S. pumila (Poiret) Schultes On dumped soil, Odd Down, Bath, S, DEG, conf.

ALG. A first record for Bath.

OTHER ALIENS. *Avonmouth Docks, G.* The docks yielded rather more of interest than in recent years. Most notable were: *Althaea hirsuta* L., *Ammi majus* L., *Descurainia sophia* (L.) Webb ex Prantl, *Eragrostis cilianensis* (All.) Lutati, *Lupinus angustifolius* L. in great quantity, *Modiola caroliniana* (L.) G. Don fil., *Setaria faberi* Hermm., *Sida spinosa* L. (apparently new to the Adventive Flora) and *Trifolium glomeratum* L. (probably the first casual record for the area). A seedling of peach, *Prunus persica* L., was also noted on a railway track. All records ALG, TGE and JS.

St Philips, Bristol, G. The demolition site of an animal feed factory produced a good crop of aliens. Besides the common *Amaranthus retroflexus* and *Echinochloa, Panicum* and *Setaria* spp., present were *Anthriscus caucalis* Bieb., previously once reported (1979) as a grain alien at Avonmouth Docks, *Chenopodium glaucum* L., *Descurainia sophia* (L.) Webb ex Prantl, *Lolium temulentum* L. var. *arvense* Lilj., *Panicum capillare* L., *Phalaris angusta* Nees (last recorded at Avonmouth Docks in 1928), *Salvia reflexa* Hornem., *Setaria faberi* Hermm. and *Solanum americanum* Mill. *S. americanum* is a very small-flowered, erect Nightshade with minutely armed, winged stems, apparently perennial although killed by the first frost, and is new to the Adventive Flora. All records ALG.

Avonmouth Sewage Works, G. A first visit to the sewage works yielded a wealth of tomato plants, together with bird-seed and other aliens, notably *Abutilon theophrasti* Medic., *Amaranthus hybridus* L., *Citrullus lanatus* (Thunb.) Mansfeld with fruits weighing up to 1 kg, *Cucumis melo* L., *C. sativus* L., *Cucurbita pepo L., Datura stramonium* L., *Echinochloa frumentacea* Link, *E. utilis* Ohwi & Yabuno, *Guizotia abyssinica* (L. fil.) Cass. and *Solanum melongena* L., the Aubergine (a single seedling), new to the Adventive Flora. Also a single plant of *Echium plantagineum* L.

Along at least 300 m of roadside bounding the works *Digitaria* spp., *Panicum capillare* L., *Setaria verticillata* (L.) Beauv. and *Sorghum halepense* (L.) Pers. were abundant and appear to be well naturalised. All records ALG, TGE and JS.

Cumberland Basin, G. The now well-known railway line and roadside site at Cumberland Basin yielded two new taxa - *Amaranthus deflexus* L. (RF, det. ALG), a perennial, last noted in Bristol in 1930 at Avonmouth Docks, and much *Consolida ambigua* (L.) P.W. Ball & Heywood; *Sorghum halepense* (L.) Pers. is well-established here, despite continued application of herbicides. The nearby Bathurst Basin site again yielded a good crop of bird-seed aliens: *Lobelia erinus* L. is established on the quay walls and has been observed elsewhere in the city (ALG).

BRYOPHYTES. *Ricciocarpos natans* (L.) Corda Abundant in rhines beside drove, near West End Farm, Nailsea, S, RF. This striking liverwort has previously been recorded for Nailsea Moor.

I thank everyone who has supplied records and helped with these, especially Mr P.J.M. Nethercott and Mr A.L. Grenfell. Mr C.C. Haworth and Dr A.J. Richards assisted with the records of *Taraxacum*. I am indebted to Long Ashton Research Station for meteorological records.

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PROCEEDINGS OF THE BRISTOL
NATURALISTS' SOCIETY

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1985

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GENERAL & SECTIONAL PROCEEDINGS

COUNCIL, 1985

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	- Hon. Secretary:	D.A. WILSON
Ornithological	- President:	H.E. ROSE, B.Sc., Ph.D.
	- Hon. Secretary:	S.M. TAYLOR, B.Sc., M.I.Mech.E.

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M.A.R. KITCHEN
Mrs C. KITCHEN
C. LITTLE, B.A., Ph.D.
C.M. LOVATT, M.A., Ph.D.
Mrs M. POOLMAN
F.H. RAWLINGS
R.G. SYMES, B.Sc.

BRISTOL NATURALISTS' SOCIETY

INCOME & EXPENDITURE - YEAR ENDED 31 DECEMBER 1985

1984		1985
£	Income	£
2607	Members' subscriptions	2626
93	Donations	137
217	Sales of Proceedings and grants	449
30	Sale of books	59
(16)	General Field Meetings profit	6
49	Buffet supper profit	13
14	Steep Holm Trust refund	-
181	Interest	253
3175		3543
	Expenditure	
823	Printing and stationery	1143
462	Postages and telephone	387
1294	Proceedings and Bird Report	1329
90	Library, books	78
139	, subscriptions and purchases of journals	163
81	, fire insurance and library expenses	25
7	Donations	7
277	Indoor meetings	269
260	Grants to Sections	220
3433		3621
258		78

BRISTOL NATURALISTS' SOCIETY

BALANCE SHEET AS AT 31 DECEMBER 1985

1984			1985
£	Assets		£
-	Government Stocks at purchase price		4000
63	National Savings Bank		410
478	Cash at Banks - current accounts		7 9
5769	-do- - deposit account		1416
2	Treasurer		16
10	Prepayment		10
-	Debtor		80
6322			6641
1326	Less creditors (hire of rooms 120; Procs 1984, 920; subscriptions in advance 412; other 80)		1536
4996			5105
	Represented by		
204	Harry Savory Illustrations Fund		206
84	Conservation Appeal		84
4000	Hector Hockey Memorial Fund		4185
708	General Fund at 31 December 84	708	
	Less loss on year	78	630
4996			5105

NOTES (1) No value is placed upon the contents of the Library and stock of publications.

(2) These accounts do not record balances held by sectional treasurers & the Ornithological Section Special Fund.

(3) The Field Committee balance is now included in the General Fund.

BRISTOL NATURALISTS' SOCIETY

SPECIAL FUNDS

Receipts and Payments for the year ended 31 December 1985

1984		1985
£	Harry Savory Illustrations Fund	£
204	Fund at 31 December 1984	204
	Additions to Fund in 1985	2
204		206
	Conservation Appeal	
84	Fund at 31 December 1984 and at 31 December 1985	84
	Hector Hockey Memorial Fund (created in 1984	
4000	Fund at 31 December 1984 invested in: £2,032.10 10½% Treasury Stock 1989 (S.B. Register) £1,911.22 13¼% Exchequer Stock 1987 (S.B. Register)	4000
	Additions to Fund in 1985 (interest on above)	340
		4340
	Grants from Fund (Stoke Bishop Nature Trail Pamphlet and Procs. publication)	155
		4185

P.J.M. NETHERCOTT
Hon. Treasurer
24 October 1986

T.B. SILCOCKS
Hon. Auditor
26 October 1986

GENERAL & SECTIONAL PROCEEDINGS

REPORT OF COUNCIL, 1985

Membership at the end of the year was 584, an increase of 10; the total included 6 Affiliated Societies and 3 Juniors.

At the Annual General Meeting the Officers and Members of Council were elected with Mr R.M. Payne as President.

The Annual Buffet Supper was held in April when Mr Parkham, Head Keeper of Bristol Zoo, spoke on "An Evening at the Zoo".

A sub-committee was set up to study ways of fund raising. Possibilities discussed included a book sale and the publication of pamphlets on popular subjects.

The financial situation made it necessary to increase the rates of subscription, for the first time in four years. The Deed of Covenant scheme is going well.

In order to help defray the high costs of indoor meetings (General and Sectional), Council decided that non-members should be asked to contribute 50p. It will be left to Chairmen of meetings to decide whether also to invite members to make a contribution, no sum to be specified.

A new prospectus in a more popular style has been printed.

We record with regret the deaths of three members: Mr G.E. Clothier, Mr M. Kelberman and Miss E.M. Purkis.

Miss A. HECKELS, Hon. Secretary

ACCOUNT OF GENERAL MEETINGS, 1985

Jan: Annual General Meeting & Presidential Address - "Landscapes II; Volcanoes and Glaciers", by Mr V. Dennison.

Feb: "The Garden as a Habitat", Members' Panel.

Mar: Slide and tape presentation by Mr R. Betteridge.

Oct: "Bumblebees", by Dr D.V. Alford.

Nov: "*Archaeopteryx* and the Origin of Flight in Bats and Birds", by Dr J.M.V. Rayner.

Dec: "A Visit to Madagascar", by Miss E. Fleure and Miss M.H. Rogers.

Miss A. HECKELS, Hon. Secretary

GENERAL FIELD MEETINGS, 1985

16 Mar Mr A.L. Grenfell. An all-day visit to the British Museum (Natural History). An interesting day during which members also had time to visit other museums in the vicinity.

5 Apr Miss R.C. Lee. A morning walk up May Hill in Gloucestershire with good views towards the R. Severn; then down through Newent Wood where wild daffodils made a good show and a Speckled Wood was seen on bracken. Afternoon visit to the Falconry Centre at Newent to see the birds of prey and watch fascinating flying displays.

2 May Mr D.A.C. Cullen. Evening meeting to Ozleworth Bottom. Sunny spring evening walk during which many birds including Cuckoo were heard and a Swift and House Martins seen. Plenty of spring flowers. Magnificent view of sunset from the Cotswold escarpment.

11 May Mr P. Thompson. Walk in the woolhope Hills in S. Herefordshire. Two

nature reserves visited. Geomorphic features explained. Rich flora included Adder's-tongue Fern, Herb Paris and Butterfly Orchid; cuckoo heard. Countryside was seen at its best.

1 Jun Mrs V.J. Kenney. Vallis Vale and Nunney. Repeat (by request) of the September 1984 walk through woodland and along Egford Brook. Several interesting geological items found including sea urchin fossil and a 6" ammonite. A three foot grass snake observed swimming and a variety of birds, flowers and butterflies were noted.

29 Jun Dr N. Malcolm. Catcott Heath (STNC) and Ashcott Heath (Nature Conservancy). Conducted walk around these reserves by Dr Malcolm and Mr B. Storer, warden of Catcott Heath. The management of the reserves was explained and many interesting plants seen, including the Bladderwort (*Utricularia vulgaris*) and Marsh Pea (*Lathyrus palustris*).

6 Jul Miss A. Heckels. Quantocks and the nearby coast. A morning walk at the eastern end of the Quantocks where some of the conservation problems were explained. Afternoon walk on the beach at Kilve and along the cliffs to East Quantoxhead and back. Geological features, many flowers.

10 Jul Mrs M.M.C. Reiss & Mr M.J. Penistan. An evening walk through Bayswood near Horton. The management of the woodland was explained, many flowers found and a fine specimen Wild Service Tree seen.

21 Sep Mr D.A.C. Cullen. A very successful day at Dawlish Warren and the Exe Estuary at Powderham. Excellent views of Gannets diving, an Arctic Skua, a number of Sandwich Terns on migration and large flocks of waders. Sand and saltmarsh flowers.

26 Oct Miss M. Jervis. Forest of Dean. A morning walk from Blaise Bailey viewpoint down through woods and past Soudley Ponds followed by visit to Dean Heritage Museum. Afternoon walk over the ridge to Blackpool Bridge and on to view a Forest 'free mine' still being worked. Various trees and some fungi noted. Autumn colours beginning.

23 Nov Miss R.C. Lee. Wentwood Forest, Gwent. Two circular walks through mainly coniferous woods with some beech and oak, on a quiet, grey November day. A Woodcock and two Crossbills were seen and some members of the tit family. On the return journey an hour was spent at Caerwent.

Miss R.C. LEE, Hon. Secretary, Field Committee

REPORT OF THE BOTANICAL SECTION, 1985

At the Annual General Meeting, held in the Schools Room of the City Museum on 28 January 1985, the following were elected:- President: Lady Rosemary FitzGerald; Hon. Secretary & Treasurer: Mr A.C. Titchen; Committee: Mr R.M. Payne, Mr A.L. Grenfell, Dr C.M. Lovatt, Mr M.A.R. Kitchen, Mrs C. Kitchen, Miss I.F. Gravestock, Mr P.J.M. Nethercott, Mrs N. Vaughan-Davies and Mrs M.A. Silcocks.

The following winter meetings were held:

28 Jan Annual General Meeting & Members' Evening.

25 Feb The Flora of Avon Project - an update.

25 Mar An impromptu evening due to the illness of the arranged speaker.

28 Oct "A Botanist on Holiday", an illustrated talk on the Balearic flora by Mr T.G. Evans.

25 Nov "Ancient Woodlands", by Mr R. Jarman.

9 Dec Members' Evening with transparencies.

The following field excursions took place, under the leadership of those shown:

10 Apr Penpole Point, Sea Mills, Mr P.J.M. Nethercott.

14 Apr Lasborough Park & Boxwell Court, Mr & Mrs M.A.R. Kitchen.

28 Apr Worle Hill, Weston-super-Mare, Dr C.M. Lovatt.

18 May Weston Bigwood, Portishead, Mrs M.A. Silcocks.

16 Jun Pewsey Vale & Marlborough, Lady R. FitzGerald.

22 Jun Winscombe and district, Mr P.J.M. Nethercott.

20 Jul Emborough Pond & Binegar Bottom, Miss I.F. Gravestock & Mrs N. Vaughan-Davies.

10 Aug Blackdown & Dolebury Warren, Mr R.M. Payne.

22 Sep Berkeley Marshes, Mr & Mrs M.A.R. Kitchen.

19 Oct Trees and Shrubs of Cotham, Mrs N. Vaughan-Davies.

In addition to walks for Avon County Planning Department under the title "Walking in Avon", members also led instructional meetings in connection with the Flora of Avon Project.

A.C. TITCHEN, Hon. Secretary

REPORT OF THE ENTOMOLOGICAL SECTION, 1985

At the Annual General Meeting held on 24 January 1985, the following were elected:- President: Mr A.H. Weeks; Hon. Secretary: Dr R.H. Poulding; Hon. Treasurer: Mr R.W. Rowe; Committee; Mr H.K. Barton, Mr G.R. Best, Mr R.S. Cropper, Dr K.W. Miller, Mr R.M. Payne, Mr K.H. Poole, Mr S. Randolph and Mr G.W. Sorrell.

The winter programme included the following indoor meetings:-

24 Jan Annual General Meeting & Presidential Address, "Why I am a Dipterist", by Mr R.M. Payne.

14 Feb Recorders' Reports and "Moths of Avon & Somerset", by Mr E.A.F. Dean.

14 Mar Entomological techniques.

10 Oct Open forum.

14 Nov "An Agricultural Chemist's View of Conservation", by Dr B. Smith.

12 Dec Annual exhibition & members' evening.

Field meetings held in the summer were:-

18 May Berrow, Mr R.S. Cropper.

15 Jun Crook Peak, Mr R.M. Payne.

20 Jul Wetmoor Nature Reserve, Mr S. Randolph.

3 Aug Draycott Sleights, Mr N. Mellersen & Mr A. Hawkins.

7 Sep Weston Moor, Gordano, Dr K.W. Miller.

There were also six meetings at Middle Hope, near Weston-super-Mare, in continuation of the survey arranged with the agreement of the National Trust. Unfortunately, poor weather for several of the field meetings prevented good attendances. The best attended meeting, with about 25 members and guests present, was at Draycott Sleights on 3 August.

At the end of the year, the Section lost two valuable members. Dr R.H. Poulding who resigned had recorded Diptera for many years, as well as contributing to the records of other orders. He was both Secretary and Editor of the Entomological Report, offices to which he devoted much time and energy. Mr H.K. Barton left Bristol for the east of England, having contributed mostly to records of Lepidoptera.

R.W. ROWE, Hon. Secretary

REPORT OF THE GEOLOGICAL SECTION, 1985

The following Officers were elected at the Annual General Meeting held on 15 January 1985:- President: Mr M. Curtis; Vice President: Dr A.B. Hawkins; Hon. Secretary, Treasurer & Field Secretary: Mr D.A. Wilson; Committee:- Mrs G. Hamilton, Mrs M O'Leary, Miss A. Dugdale, Dr D. Hamilton, Mr D.W. Cope, Mr V. Dennison, Mr T. Harrison, Mr N. Hollingsworth.

The following winter lecture meetings were held:-

16 Jan	"Local Triassic Environments", Presidential Address, Mr M. Curtis.
20 Feb	"A Geologist in Angola", by Dr W.I. Stanton.
20 Mar	"Mineral Planning in Avon", by Mr P. Hale.
23 Oct	"Early Carboniferous Environments", by Dr P. Wright.
20 Nov	"Origins of Atmospheric Oxygen", by Dr J.P.N. Badham.
11 Dec	"Trace Fossils", by Dr R. Goldring.

The following visit and two field meetings were held:-

18 May	City Museum, Wells, Professor D.T. Donovan.
23 Jun	The Wilderness Centre and the Longhope area, Mr M. Bragg.
22 Sep	The western Forest of Dean area, Mr G. Margarettes.

D.A. WILSON, Hon. Secretary

REPORT OF THE ORNITHOLOGICAL SECTION, 1985

At the Annual General Meeting held on 23 January 1985, Dr H.E. Rose was elected President and Mr S.M. Taylor succeeded him as Hon. Secretary. The retiring President, Mr R.L. Bland, gave an address on the Avon results of the BTO Winter Atlas project. Visiting speakers at the other winter meetings were Dr N. Seymour of the University of Vancouver, Dr J.D. Goss-Custard of NERC, Mr M. Ounstead of the Wildfowl Trust and Mr Jeffery Boswall of the BBC. At the December meeting Mr S.M. Taylor showed lantern slides made between 1920 and 1960 by the late J.H. Savory, former President of the Society and the Section. We were delighted to have his widow and daughter as our guests. An indoor Fieldwork Meeting was held jointly with the Bristol Ornithological Club.

Outdoor events consisted of eight half-day and six evening field walks, and eight whole day excursions. They covered all months though, as usual, most were in spring and early summer.

The major co-operative field study was a complete survey of the rookeries of Avon. Particular attention was also given to the breeding of Herons and Sand Martins, while further work was done on the tetrad survey. In winter the Birds in Gardens project was continued, as was the recording of over-wintering Blackcaps and Chiffchaffs.

We record with regret the death of our former President and long-time editorial colleague, G.E. Clothier (see Report of Council, p. 5).

S.M. TAYLOR, Hon. Secretary

REPORT OF THE LIBRARIAN, 1985

The Library this year has been without a librarian but work has continued through the efforts of members of the Library Committee who put in many hours of work during regular evening working parties. Thanks are due to Mrs V.J. Kenney, Mr P.J.M. Nethercott and Mr P.S.H. Boyce who were particularly diligent in their attendance. During the summer, holdings of foreign journals stored in the University were checked, preparatory to the drawing up of a list of foreign journals for sale. This list, together with a short list of unwanted books will be circulated to dealers. The need for disposal is particularly urgent since other journal runs formerly stored in Dr Cowie's office in the University, can no longer be held there.

During the year, Miss I.P. Keeton joined the Committee as a co-opted member. Since then we have been grateful for her professional expertise and for the progress she has made in checking and cataloguing our runs of journals in the Library.

During the year, 122 visits were made by 39 members who, between them, borrowed 201 items. Two books have been bought and six books and several newsletters donated, for which our thanks are due to Mr P.J.M. Nethercott, Mr K.T. Batty, Mr A.P. Richards and Miss I.F. Gravestock. We would like to express our thanks to Mr M. Heighton, Director of Arts, City of Bristol Council for the continuing use of the Library Room in the City Museum and Art Gallery and wish to record the Society's gratitude to the Librarian of the University for continuing to provide storage for some of our journals under the care of Mr Clive Ward of the Law Library.

Mrs A.J. HOLLOWELL

Proceedings of the Bristol Naturalists' Society (1985), **45**: 11 – 16

MELANOTEKITE FROM THE BRISTOL DISTRICT

by C. ALABASTER

(Department of Geology, University of Bristol)

ABSTRACT

Melanotekite ($Pb_2Fe_2Si_2O_9$) is recorded for the first time in the UK from the eastern Mendips and near Westbury-on-Trym, Bristol. The external form of heavily altered relict crystals from both areas is described. Melanotekite forms a minor constituent of the secondary mineral assemblage associated with Carboniferous Limestone-hosted replacement deposits of iron and manganese oxides.

INTRODUCTION

This note records for the first time British occurrences of the orthorhombic lead-iron silicate, melanotekite, at three separate localities in the Bristol District. The localities are Merehead Quarry in the eastern Mendips and two sites near Westbury-on-Trym, at Coombe Farm Quarry (ST 562 778), and a temporary exposure (infilled manganese workings) in the grounds of Wesley (formerly Didsbury) College (ST 569 783). Coombe Farm Quarry and Wesley College are situated on the N. limb of the unroofed Westbury-on-Trym anticline. At all three localities, melanotekite forms a part of the secondary mineral assemblage associated with low-temperature, Triassic age, Carboniferous Limestone-hosted replacement deposits of iron and manganese oxides (Symes & Embrey, 1977). The identity of the melanotekite was confirmed by X-ray diffraction powder photographs and quanlitative microprobe analyses.

FORMULAE OF MINERALS MENTIONED IN THIS PAPER

Melanotekite	$Pb_2Fe_2Si_2O_9$	Cerussite	$PbCO_3$
Kentrolite	$Pb_2Mn_2Si_2O_9$	Ardennite	$Mn_5Al_5(SiAsV)_6O_{24}(OH)_2$
Hausmannite	Mn_3O_4	Ganomalite	$Ca_4Pb_6(OH)_2(Si_2O_7)_3$
Goethite	$FeO(OH)$	Apophyllite	$KFCa_4(Si_8O_{20}).8H_2O$
Haematite	Fe_2O_3	Anhydrite	$CaSO_4$
Calcite	$CaCO_3$	Datolite	$Ca(BOH)SiO_4$

WESLEY MINE

At the Wesley Mn-mine, melanotekite occurs sparingly as surface films and small pockets (max 10 x 5 mm) of a sulphur yellow - blackish yellow powder encrusting massive hausmannite and cindery-looking ferroan wad. The melanotekite is closely associated with orange-brown earthy goethite and, less commonly, earthy haematite. Intimate mixtures of yellow melanotekite, earthy goethite, calcite ± earthy haematite are locally developed. In one specimen yellow melanotekite grades into a dark yellowish-brown, soft, granular phase giving a brown powder and X-ray pattern corresponding to a mixture of melanotekite and minor goethite. A total of eight specimens containing melanotekite were recorded from this locality.

MEREHEAD QUARRY

Subsequent to its discovery at the Wesley mine, yellow powdery melanotekite was identified on iron-rich wad from Coombe Farm Quarry (3 specimens) and the No. 1 vein (Symes & Embrey, 1977) at Merehead Quarry. The single specimen from Merehead shows crystalline and powdery melanotekite. The powdery material, covering an area of about 4 cm^2 is very similar in appearance to that from the Wesley mine, and coats a fracture surface on a block of mixed iron and manganese oxides taken from a position close to the vein margin. The yellow powder is rimmed by earthy goethite, suggesting that the latter may be an alteration product. The crystalline material, covering an area of about 20 x 5 mm, consists of dusty coatings and small pockets of minute friable pale yellow rhombs which crumble to a powder of similar colour under the slightest pressure. The majority of crystals are compound forms, seemingly built up of sub-parallel aggregates of thin tabular {001} rhombs. There appears to be a trend, with increase in size of compound crystal, whereby the broad tabular surface becomes increasingly concave about a diagonal bisecting the acute angles of the rhomb. Measurements of the rhomb angles from photomicrographs, compared with measurements obtained by Warren (1898) on crystals, suggest that curvature has occurred about {010}. The edges of the component crystallites in the compound rhombs are commonly bevelled so as to form the upper faces of a bipyramid; the lower faces tend to be absent or poorly developed. The acute coigns are always ragged, due to multiple repetition of $\{111\}_{\Lambda}\{1\bar{1}1\}$ or $\{110\}_{\Lambda}\{1\bar{1}0\}$ intersections; splaying of one or both ends has occurred in a few crystals. Progression towards a grossly bipyramidal habit, observed in a small number of crystals, has been effected by closure of the open ends of the 'gulley' due to enhanced crystal growth about

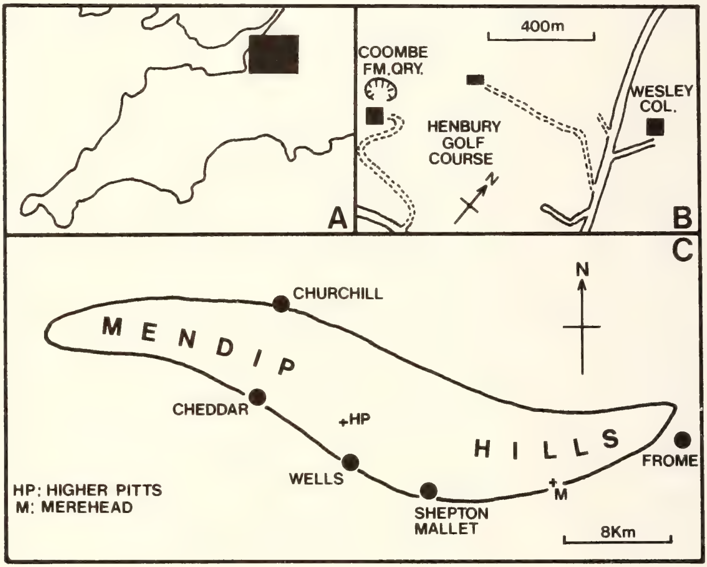

Figure 1. (A) Area covered by this study.
(B) Relationship between Wesley College mine and Coombe Farm quarry.
(C) Generalised map of the Mendip Hills.

the {100} diagonal, resulting in the development of a dimpled or hopper face on {001}. A few single rhombs clearly show combinations of pinacoid {001}, and prism {110} or bipyramid {111}. Single rhombs with perfectly developed side faces are rare.

At high magnification, pitting of crystal faces can be seen. Corrosion has preferentially affected the side faces which are usually riddled with holes (in the tabular crystals, commonly elongated {001}), while the pinacoid faces appear relatively fresh and unpitted. Broken surfaces reveal an amorphous, granular or spongy internal structure. Microprobe analysis of two large gold-shadowed compound rhombs showed no other elements present, apart from Pb, Fe and Si.

Published data for melanotekite show it to be a hard, dense, black-dark brown, lustrous, cleavable mineral with ochre-yellow streak. The Merehead crystals are clearly relicts, possessing no more than the external form of the original crystals. The soft yellowish brown material from the Wesley mine probably represents melanotekite in a less advanced state of alteration.

COOMBE FARM

At this locality, the melanotekite is commonly associated with earthy haematite and amorphous masses of soft, waxy, white, translucent serpentine group minerals. Chrysotile forms the major phase, but a small amount of lizardite may be present as well. The serpentine group minerals form veinlets and small pockets (max 2 x 1 cm) in the manganese ore; the larger pockets are always flattened parallel to the banding (if present) in the host. Melanotekite (powdery and crystalline) occurs both within the serpentine group mineral bearing pockets as small, bright yellow spots, or thin layers paralleling the margins of the pockets, and as random mixtures with calcite, magnesium silicate and earthy haematite.

The crystalline material, like that from Merehead, consists of crumbly pale yellow relicts. At high magnification the more compact melanotekite, some of which has a blackish tinge, is seen to consist of a mass of interlocking spongy grains, many of which are faceted. Euhedral crystals are rare and are restricted to drusy cavities. The majority consist of thick tabular rhombs showing combinations of bipyramid {111} and pinacoid {001}; additional forms noted include pinacoids {010} & {100} & prism {110}. Although compound crystals of the type developed at Merehead appear to be absent, stepped or concertina-like crystals are common and tend to line or form the walls of the drusy cavities. In general, the Coombe Farm crystals present a much fresher appearance than those from Merehead. Crystals of broadly similar habit have

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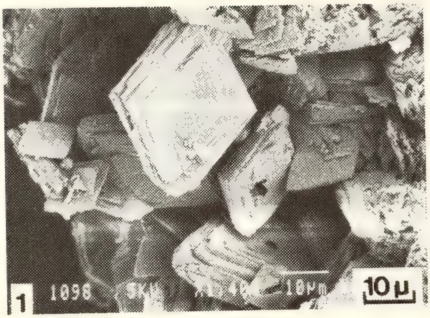
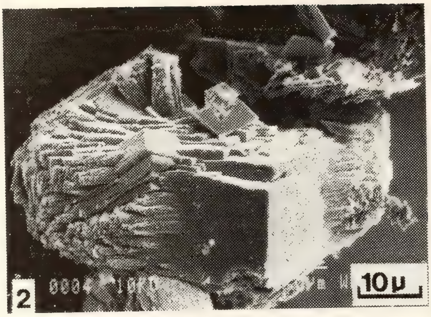
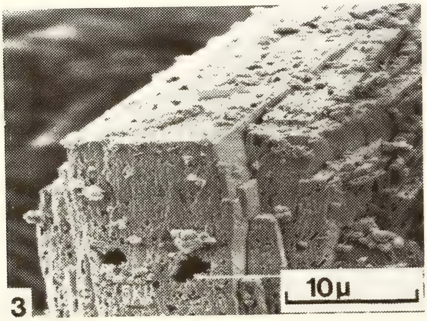
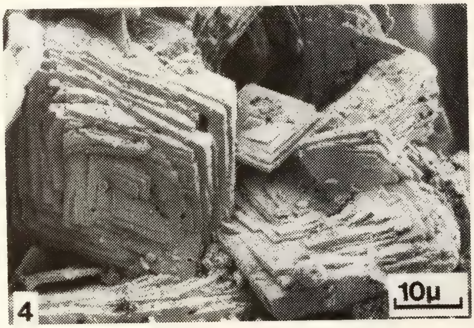
PLATE 1 (FACING PAGE) (1) *Rhomb-shaped and compound crystals of melanotekite. Large compound crystal shows curvature about* {010} *diagonal. Merehead Quarry. (Note that the horizontal line on the large crystal and streaking are instrumental artefacts).* (2) *Melanotekite crystal (essentially a combination of prism and pinacoid) in which the acute coigns have splayed outwards. Note curvature about* {010} *diagonal. Merehead Quarry.* (3) *Melanotekite crystal showing markedly different degrees of corrosion on prism faces (heavily pitted) and pinacoid faces (smooth, unpitted). Merehead Quarry.* (4) *Grossly bipyramidal compound rhomb, where initial curvature about* {010} *diagonal has been closed at both ends by subsequent enhanced growth parallel to the* {100} *diagonal, forming a deep dimple on* {001}*. Merehead Quarry.* (5) *Faceted grains of compact yellow melanotekite showing spongy or granular amorphous internal structure. Coombe Farm Quarry.* (6, 7) *Stepped crystals of melanotekite lining a cavity in the compact yellow melanotekite. Coombe Farm Quarry.* (8, 9) *Rhomb shaped melanotekite crystals showing combination of bipyramid and pinacoid faces. Coombe Farm Quarry.*


1
1098 5KV X1,400 10μm
10μ


2
0004 10KV
10μ


3
10μ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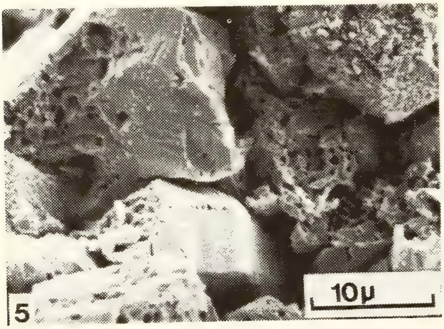
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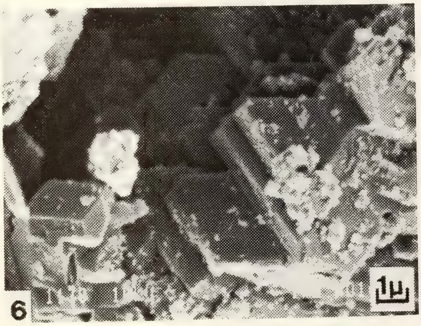
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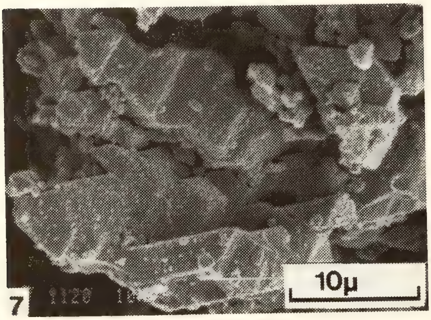
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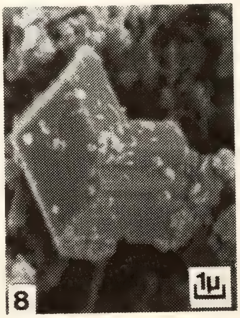
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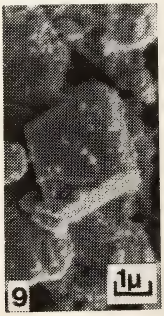
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PLATE 1

been described from Pajsberg, Sweden (Nordenskiöld, 1894).

Without exception, spot analyses of the powdery yellow Melanotekite from all three localities give lead count-rates greatly in excess of those for iron and silicon, suggesting the presence of an additional lead-phase. Although no lines are present on the powder photographs which cannot be ascribed to melanotekite, it is quite possible that a small amount of poorly crystalline, and thus relatively X-ray amorphous, cerussite may be present. At all three localities, cerussite is the principal alteration product of the other lead minerals.

Melanotekite was first described in 1880 from Langban, Sweden, from where the manganese analogue kentrolite has also been recorded. These minerals are isostructural and form a complete compositional series between the two end members (Glasser, 1967). Microprobe analyses reveal trace amounts of manganese in the powdery melanotekite from all three localities. Prior to the present discoveries, melanotekite has been recorded from four localities in Sweden and one in New Mexico (Warren, 1898; Gabrielson, 1962). Kentrolite has recently been recorded for the first time in the UK, from the Higher Pitts Mn-Fe mine, Mendip (R.F. Symes, pers. comm.)

DISCUSSION

Apart from quartz, which is almost entirely restricted in occurrence to the iron oxide component of the iron-manganese ore bodies, silicate minerals are rare in this environment. To date, recorded species include ardennite, ganomalite, datolite, apophyllite, kentrolite, melanotekite and serpentine group minerals. The widespread occurrence of what are probably Triassic age silica replacements of anhydrite nodules (Tucker, 1976; but see Milliken, 1979) in the Keuper Marls and Dolomitic Conglomerate, shows that the groundwaters at this time were rich in dissolved silica. Many of the 'iron-only' and all of the 'iron-manganese' ore bodies are thought to have been deposited from Triassic groundwaters, with the secondary mineral assemblages containing lead and copper (associated with the iron-manganese deposits) developing at some later date as a result of *in situ* chemical reactions between desorbed metallic impurities from the manganese oxides, anionic species associated with the iron oxides, and chloride ions derived from an external source. Experimental work has shown that both silica and ferric hydroxide will precipitate from groundwater containing manganese and iron over a similar pH range, leaving the resulting manganese-enriched solutions virtually silica-free. This could account for the common occurrence of the often considerable amounts of quartz in the iron ores and the virtual absence of this mineral from the manganese oxide bodies. It is therefore not surprising that only small quantities of lead-containing silicate minerals are present in this environment.

ACKNOWLEDGEMENTS

Grateful thanks are due to Mr I.H. Ford and Dr R. Bradshaw (Department of Geology, University of Bristol) for help received during the course of this study and to Dr D. Dingley (Department of Physics) and Dr D. Thompson (Department of Chemistry) for scanning electron microscope facilities and microprobe analyses respectively.

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PLATTNERITE FROM THE BRISTOL DISTRICT

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ABSTRACT

The mode of occurrence of massive and well crystallised plattnerite (PbO_2) as a minor late stage replacement of oxychlorides of lead, lead and copper, and in one case the basic carbonate, hydrocerussite, is described for three separate localities in the Bristol District. At each locality, the lead compounds form a part of the secondary mineral suite associated with replacement deposits of iron and manganese oxides of Triassic age. It is suggested that slow diagenetic changes in the composition of the porewaters within the manganese ore bodies gave rise to strongly alkaline oxidising solutions which oxidised some of these lead-II compounds to PbO_2. Plattnerite has not been previously described from the Bristol District.

INTRODUCTION

Plattnerite has been found at three widely separated localities in the Bristol District, at (a) Merehead Quarry (eastern Mendips); (b) Higher Pitts Farm (Priddy, central Mendips); and (c) a temporary exposure in the grounds of the Wesley (formerly Didsbury) College, Westbury-on-Trym, near Bristol. At all three localities, plattnerite forms a very minor component of the secondary mineral assemblage associated with low-temperature replacement deposits of iron and manganese oxides of Triassic age. The Wesley College exposure, hereinafter referred to as the Wesley mine, consisted of backfilled manganese workings exposed in foundation trenches, in which a similar range of secondary minerals to that recorded from the Mendip localities (cf. Alabaster, 1982) occurs in loose blocks of manganese oxide, mineralized Carboniferous Limestone and nodules of calcite, distributed throughout the rubble infill. Very little of the Fe-Mn mineralization could be seen *in situ*. At Westbury-on-Trym and Merehead the Fe-Mn mineralization is hosted by Carboniferous Limestone but, at Higher Pitts, where Upper Triassic limestone breccias rest unconformably on the Carboniferous Limestone, the bulk of the mineralization occurs within the

FORMULAE OF MINERALS MENTIONED IN THIS PAPER

Plattnerite	PbO_2	Mereheadite - unpublished	
Galena	PbS	Blixite	$Pb_2Cl(O.OH)_2$
Tetrahedrite	$(Cu,Fe)_{12}Sb_4S_{13}$	Laurionite	$Pb(OH)Cl$
Cerussite	$PbCO_3$	Paralaurionite	$Pb(OH)Cl$
Mendipite	$Pb_3O_2Cl_2$	Wulfenite	$PbMoO_4$
Crednerite	$CuMnO_2$	Chalcocite	Cu_2S
Hydrocerussite	$2PbCO_3.Pb(OH)_2$	Hausmannite	Mn_3O_4
Chloroxiphite	$Pb_3CuCl_2O_2(OH)_2$	Brucite	$Mg(OH)_2$
Diaboleite	$Pb_2CuCl_2(OH)_4$	Minium	Pb_3O_4

breccias. Hydrothermal lead and copper sulphide-bearing veins of possible Middle or Upper Jurassic age have been seen to cut the Fe-Mn mineralization at both Merehead and the Wesley mine. Galena (Gough, 1967) and tetrahedrite (Kingsbury, 1941) have been reported from the Higher Pitts mine, which suggests that hydrothermal sulphide-bearing calcite veins may likewise cut the Fe-Mn mineralization at this locality. A common mode of formation and diagenetic history for these iron and manganese oxide ore bodies and their associated secondary mineral suites is indicated by the close similarities between the deposits.

MODE OF OCCURRENCE OF PLATTNERITE

At all three localities plattnerite occurs almost exclusively as a minor replacement of lead oxychloride minerals. Under these conditions it variously occurs as irregular grains (in section up to 4 mm diameter), stringers, films, crystalline crusts and clumps of distorted crystals. The colour varies from resinous, dark chestnut brown on fracture surfaces to jet black with adamantine lustre on crystal faces. Red internal reflections are occasionally visible under a medium power binocular microscope. Alteration is to white, opaque, or, less commonly, clear crystalline cerussite, which is often associated with a dull earthy red-reddish brown powder. X-ray diffraction analysis shows this powder to consist essentially of a fine mixture of cerussite and plattnerite.

At the Wesley mine, a total of eight specimens containing plattnerite were found. Two examples in which mendipite is the principle mineral phase show an intimate association between plattnerite and heavily altered crednerite. Six specimens of mendipite, now shown to contain plattnerite, were noted amongst material collected by A. Kingsbury in the 1930's from Higher Pitts farm. One of these samples and a specimen from Merehead shows a similar association of crednerite and plattnerite. A total of fifteen examples of plattnerite were discovered in an extensive collection of cerussite, hydrocerussite and lead oxychlorides obtained in the 1950's from the first exposure of the manganese mineralization at Merehead (Loupekine collection in Bristol City Museum) and amongst specimens collected more recently from the No. 1 and No. 2 veins in the main quarry. Plattnerite replacements of chloroxiphite and/or diaboleite were found at both Mendip localities; the Cu-Pb oxychlorides appear to be less readliy replaced than the enclosing lead oxychloride mineral, mendipite. The Merehead quarry has provided the only recorded example of plattnerite replacing a lead carbonate, which well illustrates the apparent bias in favour of a lead oxychloride host. The specimen comprises several 5 mm diameter barrel-shaped crystals of hydrocerussite containing a randomly orientated mass of colourless acicular inclusions adjacent to a 1.5 cm diameter grain of massive "mereheadite", a blixite-like mineral (Symes & Embrey, 1977). Although a few thin films and patchy concentrations of plattnerite occur along the hydrocerussite cleavage, both the "mereheadite" and the acicular inclusions have been preferentially replaced. Replacement of the hydrocerussite is most pronounced where the greatest concentrations of acicular inclusions are developed.

The fibrous/prismatic lead oxychlorides appear to have been most susceptible to replacement. In general, the plattnerite grains are aligned or elongated parallel to the length of the crystals, which direction always coincides with at least one prominent cleavage. Thin films of plattnerite following the cleavage directions and/or cross-cutting hairline fractures in the host give way, in a more advanced state of replacement, to sinuous, often crystal-encrusted sheets of massive plattnerite. In hand specimens, high concentrations of plattnerite give the host mineral a streaky purplish-brown colouration. Plattnerite replacements of the massive "mereheadite" show no preferred orientation due to the absence of a well developed cleavage in the host mineral.

The thickest plattnerite sheets usually occur at the margins of the oxychloride nodules. Scanning electron microscopy reveals the inner surface of the sheets to be covered with a jumbled mass of minute, smooth-sided, generally uncorroded, distorted crystals. Euhedral crystals are rare. The most common recognisable forms appear to be the pyramids {h0l} and {hkl} usually in combination with {001}, and prisms {100} and {110}. Plattnerite crystals showing various combinations of {100} with pyramids {301}±{101}±{332}, and {001} have been described from Idaho, U.S.A. (Yeates & Ayres, 1892). The crystal-encrusted surface of the sheets and larger isolated plattnerite grains are commonly separated from the host by a narrow gap or a zone of spongy looking oxychloride. At both Merehead and Higher Pitts small crystals of diaboleite, sometimes showing uncorroded euhedral faces, are occasionally found either within the spongy zone or as encrustations on the surface of the plattnerite sheets. All specimens that show this relationship also contain chloroxiphite and/or crednerite.

DISCUSSION

The close similarity in mode of occurrence of plattnerite at Higher Pitts, Merehead and the Wesley mine, suggest that this mineral formed under similar conditions at each locality. A limited study of the fluid inclusions in the secondary mineral suite at the Wesley mine revealed the presence of 2-phase liquid-rich inclusions developed along healed fractures in all the mineral species examined (calcite, laurionite, paralaurionite, mendipite, wulfenite). Homogenization temperatures fall within the range 60-68°C, which is in close agreement with homogenization temperatures (57-72°C) obtained from 2-phase liquid-rich inclusions in calcite from a chalcocite-bearing calcite vein which cuts the manganese ore. Similar 2-phase liquid-rich inclusions were seen in mendipite from both Merehead and Higher Pitts, but no data for their range of homogenization temperatures are available. At the Wesley mine, the abundance of 2-phase inclusions in the secondary minerals and the occurrence of discrete grains of copper sulphides in the compact manganese oxide show that the hydrothermal fluids thoroughly permeated the manganese orebody. It follows that this hydrothermal episode must have occurred well after the bulk of the secondary mineral suite had crystallised. Field evidence suggests that a similar situation exists at Merehead. The abundance of plattnerite-free oxychloride nodules containing 2-phase inclusions and the almost total lack of replacement by plattnerite of the lead carbonates suggests that there is probably no connection between the hydrothermal mineralization and the alteration of the lead oxychlorides to plattnerite. However, much of the cerussite is an alteration product of earlier-formed minerals and could thus have formed at any time up to, and including, the present day.

Examination of the primary fluid inclusions in laurionite, paralaurionite and mendipite from the Wesley mine indicates crystallisation of these minerals from dilute brines at a temperature of less than 50°C. The abundance of calcite, cerussite and hydrocerussite at each locality shows that, for much of the time, the pore waters within the manganese ore bodies were rich in dissolved carbonate. The chloride brines are thought to have been derived mainly from Rhaetic or Lower Jurassic seawater, but possibly with a hydrothermal contribution as well (Alabaster, 1982). Wide fluctuations in the chemistry of the porewaters over space and through time are indicated by the complexity of the secondary mineral suites. The widespread occurrence of hydrocerussite, both as a primary crystalline phase and as an alteration product of the lead oxychlorides, along with the presence of hausmannite and brucite at Merehead and hausmannite at the Wesley mine indicates the development of a period of strongly alkaline conditions at all three localities.

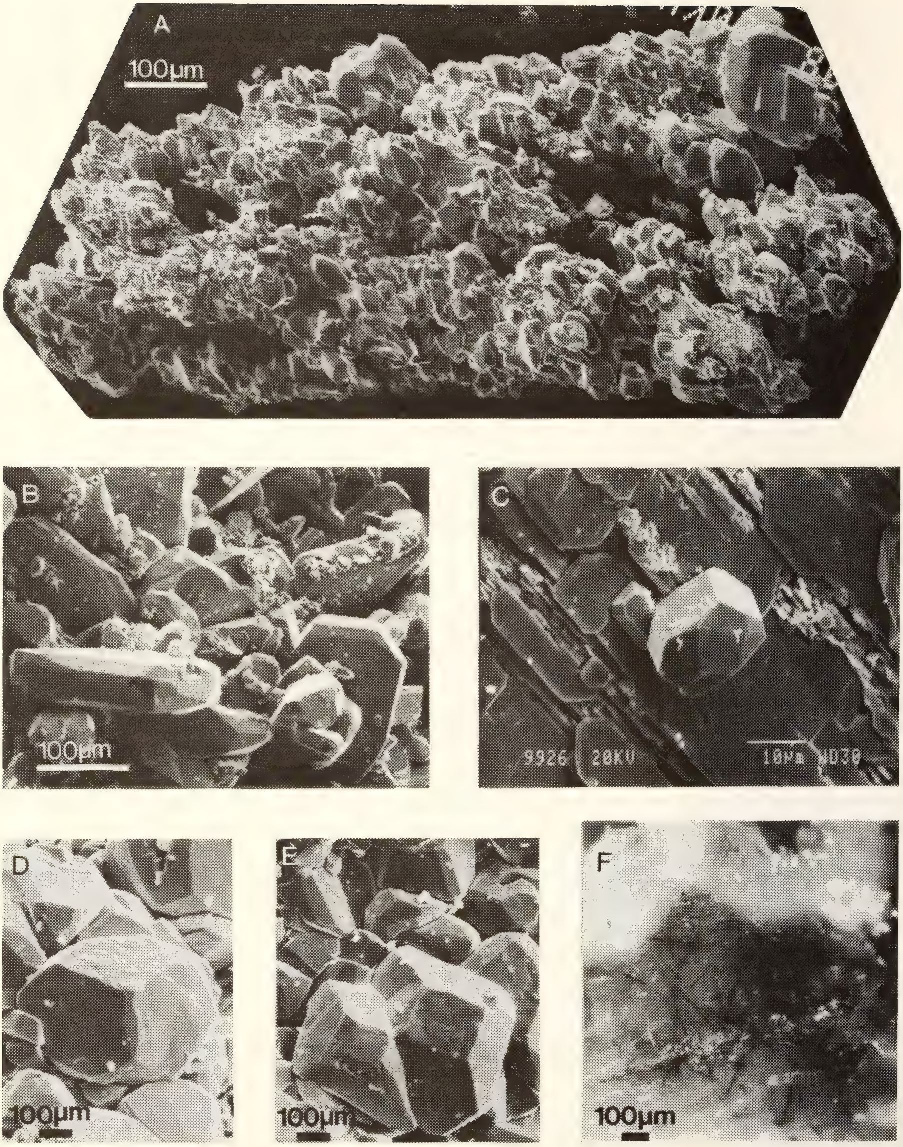

PLATE 1 (A) *Isolated cluster of plattnerite crystals developed in mendipite. Wesley mine.* (B) *Tabular crystals of plattnerite. Merehead Quarry.* (C) *Plattnerite crystal (centre of photograph) associated with tabular diaboleite developed on chloroxiphite which has been partially replaced by massive plattnerite. Merehead Quarry.* (D, E) *Euhedral plattnerite crystals. Wesley mine.* (F) *Acicular inclusions of plattnerite in hydrocerussite. Plattnerite has preferentially replaced acicular crystals of an unidentified mineral (?a lead oxychloride) developed in the hydrocerussite. Merehead Quarry.*

The Eh-pH diagrams of Garrels & Christ (1965; fig. 6, 26b) depicting the fields of stability of the lead oxides and carbonates in water at 25°C and at atmospheric pressure, show that for a system containing a fixed high concentration of dissolved carbonate, plattnerite is stable only under alkaline conditions. In a moderately oxidising alkaline environment, the plattnerite stability field shares a boundary with that of cerussite and, at progressively higher pH values, hydrocerussite, and then minium. Minium has been provisionally identified on a specimen from Merehead quarry, where it occurs as a dull red scaley encrustation on uncorroded crystals of plattnerite (DeCouet collection, Bristol City Museum). Garrels & Christ's diagram suggests that at an otherwise favourable Eh, only a small decrease in pH would be sufficent to prevent the formation of plattnerite; such a change could occur if the carbonate content of the solution were to be increased. The almost total lack of replacement by plattnerite of the lead carbonates may thus largely be due to the localised buffering of the oxidising solutions by these minerals at a pH below that at which plattnerite could form. Both cerussite and the lead oxychlorides are soluble in a strongly alkaline aqueous solution. The relative insolubility of hydrocerussite would, under the same conditions, reduce its effectiveness as a carbonate buffer, so that limited alteration to plattnerite might be expected to occur in some circumstances. In those areas where less strongly oxidising conditions prevailed, solution of the lead oxychlorides and/or alteration to hydrocerussite, cerussite or minium could occur, depending upon the composition of the reacting brines.

Fracturing of the oxychloride nodules and opening up of the cleavages of prismatic species such as mendipite, could have resulted from internal stresses within the ore bodies associated with the crystallisation and compaction of the manganese oxide gels. Platy, cleavable masses of crednerite projecting inwards from the margins of some of the mendipite cavity fillings could have acted as channelways for the oxidising solutions, resulting in a greater degree of replacement of the host in the immediate vicinity of the crednerite. This would account for the plattnerite/crednerite intergrowths, a mineral association which cannot be of primary origin (see, for example, Gaudefroy *et al*, 1966). The crystalline encrustations of diaboleite with or without hydrocerussite, on plattnerite, mark a return to less strongly oxidising conditions within the zone of replacement. The required copper could have been derived from pre-existing copper minerals within the oxychloride nodule. In the UK plattnerite has previously been recorded from the Leadhills-Wanlockhead area of Scotland, where it forms part of the secondary mineral assemblage associated with oxidised hydrothermal lead-bearing veins (Heddle, 1889).

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HIGH-DENSITY FAULTS IN THE INFERIOR OOLITE OF THE COTSWOLD SCARP ABOVE WOTTON-UNDER-EDGE, GLOUCESTERSHIRE

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ABSTRACT

Densely-spaced step faulting and rotation of Inferior Oolite strata are described from a temporary exposure at a reservoir site on the Cotswold scarp at Wotton-under-Edge. In this area of largely undisturbed strata the faults are unusual. Possible causes for this phenomenon are considered. These include involvement in regional E-W trending block faulting in Cainozoic times, post-Pleistocene superficial disturbance, or a combination of these.

INTRODUCTION

A temporary excavation for a small service reservoir was carried out on top of a promontory ½ km W of Coombe Hill (ST 7602 9403) above Wotton-under-Edge, Gloucestershire (Fig. 1), in May 1983. The reservoir site was excavated for the Severn Trent Water Authority and came to the author's notice only after the concrete base had been inserted. Four visits were made in all when it was realised that the exposure showed an unusual concentration of small faults. In other exposures in the Inferior Oolite around Wotton faulting is absent. The excavation itself was approximately 544 square metres in area and 3.4-4.8 metres deep. A water pipe trench leading out of the site was also briefly examined for a distance of 30 metres towards the south.

GEOLOGICAL SETTING

The geology of the area has been described by Cave (1977), and a suggested revision of the Lower Inferior Oolite lithostratigraphy was given by Mudge (1978). The succession recorded in the excavation was as follows:-

UPPER INFERIOR OOLITE	WHITE OOLITE BEDS	1.5 m seen
	CLYPEUS GRIT	1.8 m
	UPPER *TRIGONIA* GRIT	1.7 m
	....	BORED SURFACE
	LOWER INFERIOR OOLITE	1.4 m seen

According to Cave (1977 Fig. 10) the Lower Inferior Oolite here is about 14 m thick, and below it are found the Cephalopod Bed (4.6 m), Cotteswold Sands (about 61 m) and Upper Lias Clay (7.6 m seen).

The Inferior Oolite forms a capping on the top of the promontory while the underlying Upper Lias formations form the slopes of the scarp face. Some of the strata in the Wotton area have very low dips towards the NE, but generally they are flat lying. There is a major fault along the floor of Waterly Bottom trending WNW-ESE and another through Wotton trending NNE-SSW (Cave 1977: 244). The regional pattern of faulting across the Cotswolds has a mainly E-W trend. The lithologies in the excavation showed no important differences from those observed by Cave elsewhere in the immediate area.

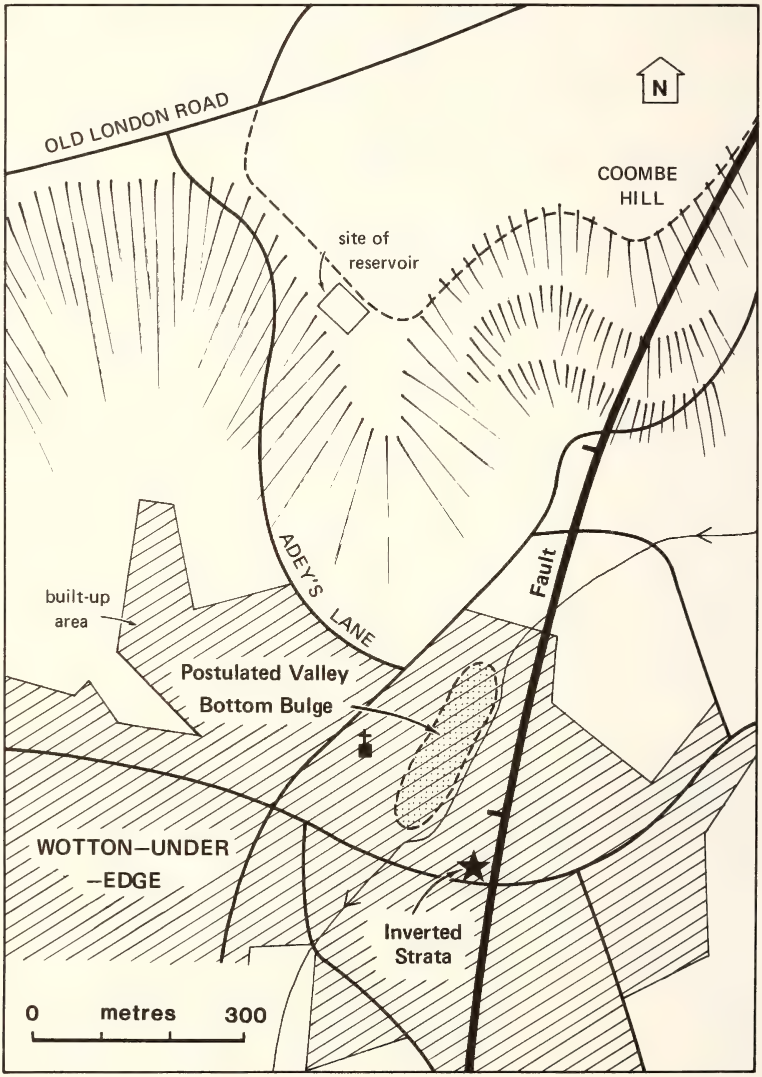
OLD LONDON ROAD
N
COOMBE HILL
site of reservoir
built-up area
ADEY'S LANE
Fault
Postulated Valley Bottom Bulge
WOTTON–UNDER –EDGE
Inverted Strata
0 metres 300

Figure 1. Site Map (see text for explanation).

STRUCTURES

Structures of three types were measured, recording bedding surfaces, joints and faults. Details of the structures can be seen in Fig. 2, which also shows the throw of the faults. The faults could not be traced across the floor of the excavation for reasons already given. Fig. 2 shows that the strata have been tilted back into the hillside in a northerly direction and have been dissected by a series of closely-spaced normal faults downthrowing progressively to the south. 21 fault trends were measured and 17 of these lay between 083° and 106° with a mean of 097°. Calculations from apparent dips of the strata indicate a general true dip of 20°, strike 102°. The throws of the faults are small (mean 0.5 m), but a major displacement of approximately 2.0 m, marked by a zone of rubble about 0.5 m wide, was recorded at points A1 and A2 (see Fig. 2), trending 074°. It is considered that these two zones are part of the same disturbance.

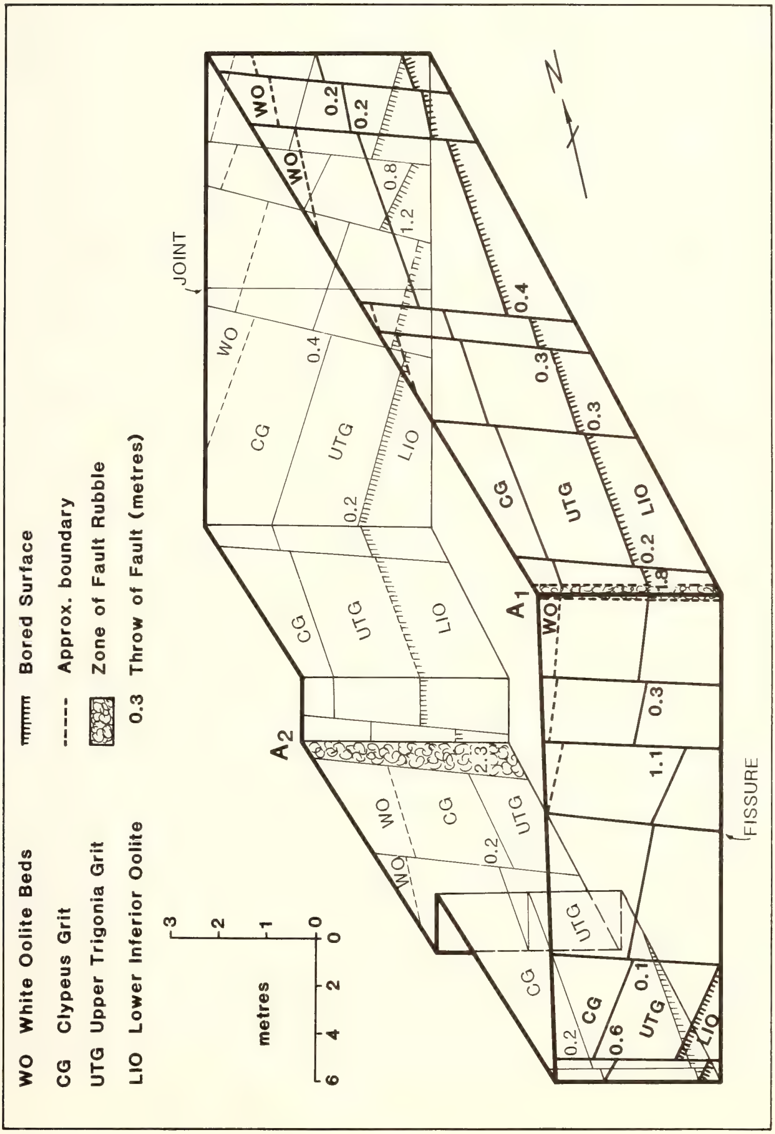
WO White Oolite Beds
CG Clypeus Grit
UTG Upper Trigonia Grit
LIO Lower Inferior Oolite
Bored Surface
Approx. boundary
Zone of Fault Rubble
0.3 Throw of Fault (metres)
metres
0
1
2
3
0
2
4
6
N
JOINT
FISSURE
A1
A2
WO
CG
UTG
LIO
0.2
0.2
0.8
1.2
0.4
0.3
0.3
0.4
0.2
1.8
0.2
2.3
0.3
1.1
0.1
0.6
0.2

Figure 2. Block diagram of the reservoir excavation showing faulting.

The pattern of faulting seen in the excavation was also noted in a narrow waterpipe trench leading out from the site and descending the hillside to the west. This shows that the structures continue away from the excavation in a southerly direction. The faulting within the excavation is shown in Plate 1.

DISCUSSION

The pattern of faulting is either tectonic or superficial, possibly both. The trend is similar to that of the regional E-W pattern in the Cotswolds (Hancock, 1969) and parallels a system in southern England interpreted as a reactivation in Cainozoic times of an older Jurassic trend (Bevan, 1984). Alternatively, the pattern could have resulted from post-Pleistocene landslipping along listric faults which, together with other superficial structures, are widespread along the Cotswold scarp and have been described in detail by Ackermann & Cave (1968) in the Stroud area.

Around Wotton, Cave (1977) states that superficial disturbance is only slight and this can be clearly demonstrated in local exposures of the Inferior Oolite such as those at Wotton Hill (ST 754 939), near Coombe Hill (ST 7675 9425), Lisleway Hill (ST 7693 9352) and Nibley Knoll (ST 7450 9570). Additionally, slopes in the Wotton area lack the "billowy" and irregular relief of mudflows and foundered ground. The spur on which the reservoir site was excavated, however, does possess an irregular profile when viewed from the W or E (Plate 2), and rises in a series of steps from the south. These steps do not occur on the W or E sides of the hill, nor do they appear to reflect lithological variation.

An origin for the faulting by superficial disturbance would be anomalous in this area, and supporting evidence is scant. What is available, however, does cast some light on the problem. Cave (1977: 91) noted inversion of the Middle and Upper Liassic strata, with an ESE dip of up to 60°, in a road cutting at ST 762 933 near Potter's Pond, Wotton (Fig. 1). Rotational shearing of the originally near-horizontal beds of 180°-240° must have occurred, and Cave suggested the cause was likely to be a late or post-Pleistocene valley bottom disturbance. It is of interest to note that this phenomenon has occurred across the valley immediately to the south of the reservoir hill.

Ackermann & Cave (1968) have described valley bottom bulges caused by rotational shearing. One such may have developed in the base of the valley below the reservoir hill (Fig. 1), although little topographic evidence has survived in an area which has long been built over by factories and housing.

A postulated valley bottom bulge would adequately account for the anomalous disturbances seen in the excavation, where the toe of the hill would have been undermined, causing readjustment of the strata upslope in the form of step faulting. The presence of the bulge here could possibly be related to structural weaknesses in the bedrock adjacent to the major fault crossing the valley at this point (Fig. 1).

The apparent paucity of joints at the reservoir excavation (only a single joint and a fissure were noted in the survey, Fig. 2) could be accounted for if an original E-W trending joint system, as noted in the Cotswolds by Hancock (1969), was utilised near the surface during the tectonic disturbances, so becoming planes of movement now seen only as the faults.

CONCLUSION

The high-density faults could have been part of the regional E-W block faulting, which bears no relationship to the post-Pleistocene readjustment of the present topography. In view of the evidence available however, a more likely cause is that of superficial landslipping, although a combination of

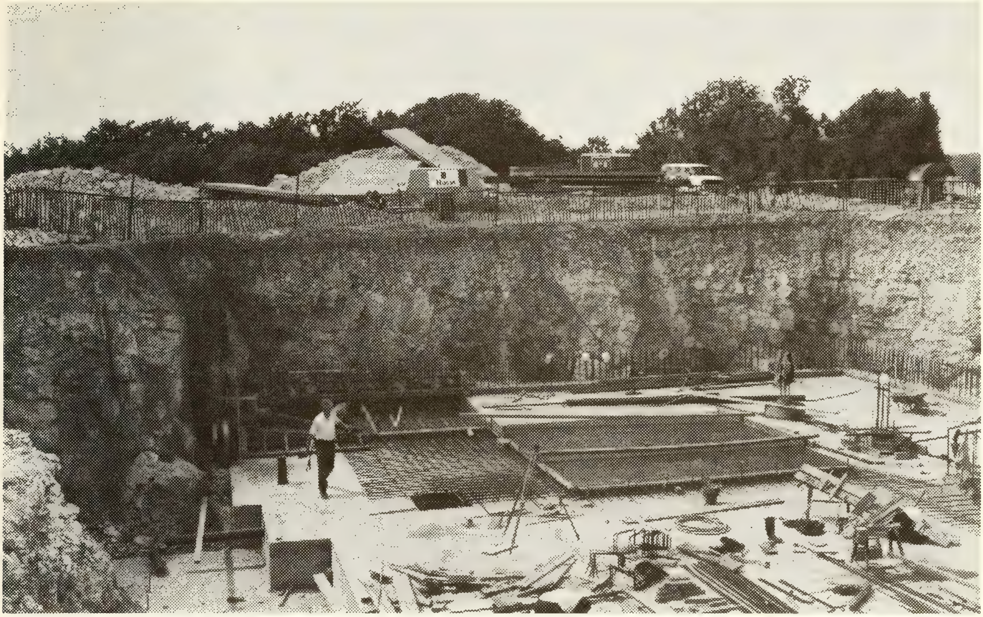

Plate 1. View of the NW face of the excavation showing faulting and dip of the strata.

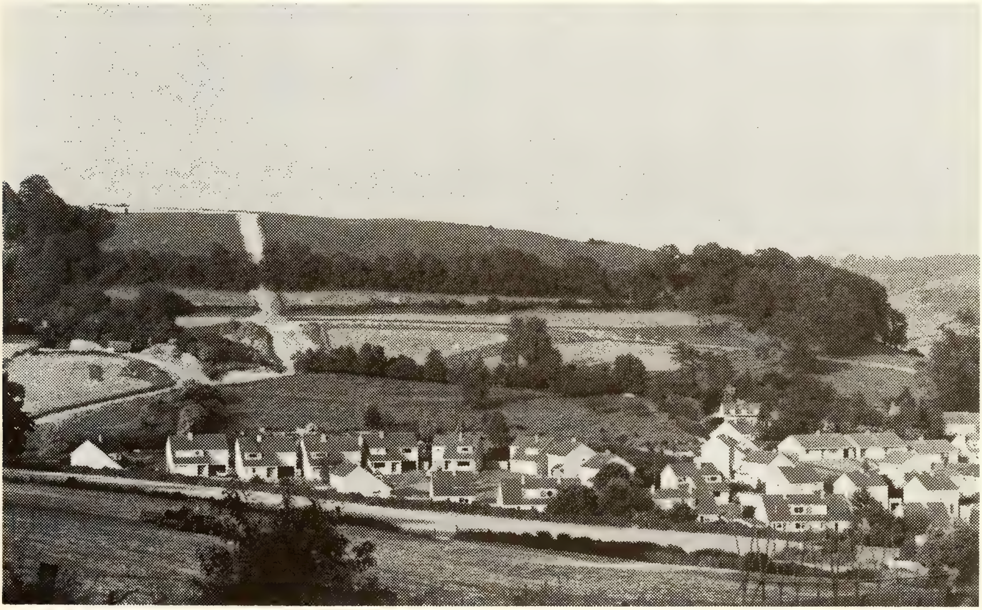

Plate 2. Photograph of the west face of the reservoir hill, showing its undulating profile.

both processes could also be considered.

ACKNOWLEDGEMENTS

The author wishes to acknowledge help given by J.P. Angeesing, J.R. Harpum and G.F. Margretts of the College of St. Paul and St. Mary Cheltenham, during the course of this work. My thanks go also to the Severn Trent Water Authority for access to the site during working operations.

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THE ALLUVIAL FAN AT BURRINGTON COMBE, MENDIP: A STUDY OF ITS MORPHOLOGY AND DEVELOPMENT

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ABSTRACT

As a result of mapping the morphology of the alluvial fan at the exit of Burrington Combe, four distinct morphological units are identified. These are distinguished by changes of gradient marked by small breaks of slope on the fan surface. In support of the interpretation of the geomorphological observations, an analysis was made of the soil samples available from each unit. Although differences between the chemical properties are apparent, the limited number of sampling points means that results are only indicative of a trend, rather than providing conclusive evidence. When combined, mapping and soil investigations demonstrate an orderly sequence of fan development which reflects successive phases of aggradation.

INTRODUCTION

The existence of extensive gravel deposits at the mouths of many of the now dry valleys and gorges of the Mendip hills has been noted since the end of the nineteenth century (Woodward, 1876). More recently, several studies have attempted to elucidate more fully the distribution, morphology, depositional histories and the soil and sedimentary properties of these fan gravels (Clayden & Findlay, 1960; Findlay, 1965, 1977; Green & Welch, 1965; Macklin, 1986). We now report the results of a detailed morphological survey and a preliminary investigation of the pedological characteristics of the alluvial fan at Burrington Combe and suggest a model for fan development.

The Burrington valley system (ST 476 589, fig. 1) runs across the north flank of the unroofed Blackdown anticline such that its headwater valleys originate on the Old Red Sandstone core of the anticline and then concentrate to cross the Carboniferous Limestone in a northerly direction via a deeply incised gorge. The valley then opens out to cross the Triassic deposits banked against the north flank, at first the coarse fossil screes of the Dolomitic Conglomerate and then the much finer clays of the Keuper Marl which underlie the valley of the Blagdon Yeo and onto which the fan sediments have been deposited. These fan gravels extend some 2 km from the mouth of the gorge and for about 5 km to the west along the north flank of the Mendips from Rickford (ST 486 598) to Churchill Green (ST 429 602). They vary in thickness from 1 - 4 m and are in places mantled with colluvium and windblown material (Findlay, 1965). Lithologically they are composed of Old Red Sandstone and Carboniferous Limestone derived material.

Although the alluvial fan at Burrington is at present inactive it lies at a site typical for fan development where a valley with a steep gradient disgorges on relatively flat land (Bull, 1977). Alluvial fans of both Holocene and Pleistocene age have been noted in similar topographic positions at several localities in Britain, e.g. near Crickhowell, South Wales (Crampton, 1969), at confluences of the Rivers Clydach and Grwyne with the Usk in S. Wales (Pounder,

1978) and at several tributaries joining the R. Swale in N. Yorkshire (Pounder, 1978).

METHODS

MORPHOLOGICAL MAPPING

Morphological mapping requires the identification of breaks of slope and changes in gradient and has most successfully been used in areas with relatively 'fresh' land forms (Rose, 1981; Sissons, 1979). Unfortunately, much of the surface of the Burrington Combe fan has been modified both by gravitational slope processes and anthropogenic activity, notably ploughing, land drainage and the construction and removal of field boundaries. Many of the slopes are degraded and, except in the case of more recent fluvial, erosional and depositional forms, the identification of fan surface landforms depends on noting subtle changes of gradient rather than distinct breaks of slope. This distinction is shown by different mapping symbols (Fig. 2). Aerial photographs were available for the whole of the study area and allowed some of the more prominent surface forms to be identified. These were subsequently confirmed by field mapping.

A map at the scale of 1:5,000 was created by enlargement from the O.S. 1:10,000 scale and used as a base map for field mapping. To identify changes of fan gradient, spot heights were obtained on selected parts of the fan. The majority of the heightings were made using Wild Di 3 Distomat electro-distance measuring equipment. When this was not available a Hilger & Watts quickset level and staff were used. All heightings were based on O.S. bench marks using closed traverses. Closing errors were less than - 0.15 m.

HEIGHT SURVEYING

The locations of spot heights (Fig. 2) were chosen so as to quantify changes of slope angle where these were apparent from field mapping, and to allow a series of long profiles trending down the fan to be drawn. Spot heights were also used to measure the height of small depositional lobes which occurred on the fan surface. Five transects were made in addition to heightings taken near the apex of the fan (Fig. 3).

RESULTS OF FIELD MAPPING

THE FORM OF THE FAN SURFACE

The west side of the Burrington Combe fan is separated from an adjacent fan near Churchill (ST 429 602) by the Langford Brook which has incised into the fan, producing a series of small terraces. The southern margin of the fan is less distinct and grades sometimes imperceptibly into the underlying Keuper Marl. On the east side, the Rickford Stream separates the fan from a lower gravel spread which terminates in slopes down to the River Yeo. These slopes have two distinct facets, suggesting at least two phases of valley incision.

Mapping revealed the presence of a suite of morphologically distinct fan units; these were named in descending order of height: Link Lane, Ashey Lane, Havyat and Langford (Fig. 2).

(A) The *Link Lane Unit* extends from the apex where the fan emerges from Burrington Combe to a break of slope which is clearly seen at Langford Green Farm (ST 473 595). At this site the change in elevation between the upper part of the fan and the adjacent area is 1.52 m. Further east the difference in height between the two elements of the fan surface becomes less, 0.54 m at ST

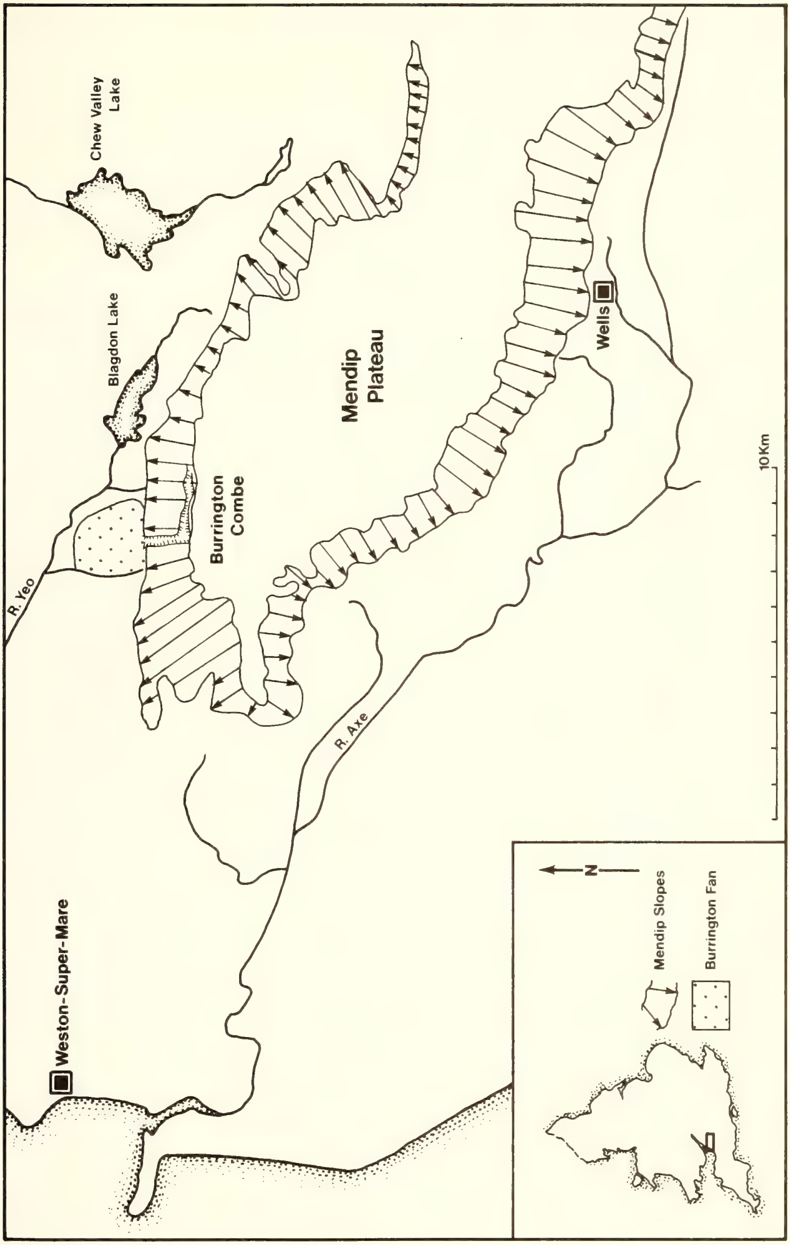
Chew Valley Lake
Blagdon Lake
Mendip Plateau
Wells
Burrington Combe
R. Yeo
R. Axe
Weston-Super-Mare
10Km
N
Mendip Slopes
Burrington Fan

Figure 1. The Location of Burrington Combe and its associated fan (after Findlay, 1965).

4742 5975 and only 0.25 m at ST 4745 5984. The gradients of this fan unit range from 30-40 m/km (Fig. 3).

(B) *Ashey Lane unit*. This extends from the break of slope described above, to the east of Havyat Green (ST 478 609) area where a slight break of slope occurs. This fan unit has a gentler gradient (transect 4, fig. 3) of 20 m/km, decreasing to less than 10 m/km at its distal end. The surface of the fan unit is dissected by a series of channel-like features separated by lobate forms which suggests past fluvial activity. The section described at Bourne (Findlay, 1977) occurs in this element of the fan.

(C) *Havyat unit.* Within this unit of the fan the soil series as mapped by the soil survey changes from the Langford series to the Worcester series, a soil normally developed on Keuper Marl. Geomorphologically however, this transition reflects a thinning of the fan gravel at the degraded feather edge of the Burrington fan.

(D) *Langford unit.* This is an extensive area some 3-4 m below the Link Lane unit of the fan, extending from the Langford Brook in the west to the

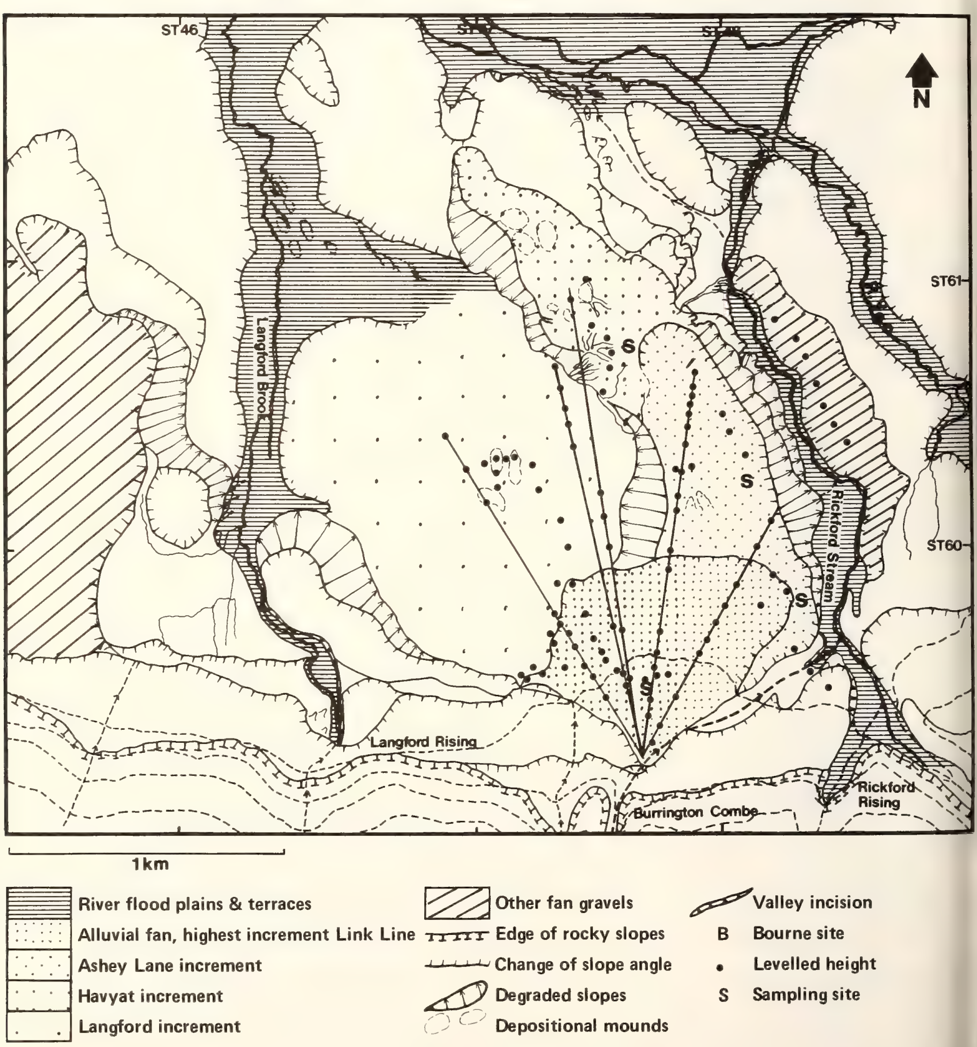
ST46
N
ST61
ST60
Langford Brook
Rickford Stream
S
S
S
S
Langford Rising
Burrington Combe
Rickford Rising
1km
River flood plains & terraces
Alluvial fan, highest increment Link Line
Ashey Lane increment
Havyat increment
Langford increment
Other fan gravels
Edge of rocky slopes
Change of slope angle
Degraded slopes
Depositional mounds
Valley incision
B Bourne site
• Levelled height
S Sampling site

Figure 2. The Features of the Alluvial Fan.

western margins of the Link Lane, Ashey Lane and Havyat fan units in the east. Although cultivation has smoothed much of its original surface morphology, small lobate microrelief forms can still be recognised (Fig. 2).

THE RIVER VALLEYS

Three rivers have dissected the gravel fan. The River Yeo has trimmed the eastern and northern edges. A left bank tributary of the Yeo appears to have cut back and captured the Rickford stream which now has a sharp right bend where it turns towards the R. Yeo, but there is clear evidence that it formerly flowed north-west through the now dry valley which lies between the gravel fan and a small hill composed of Keuper Marl (Fig. 2). The Rickford stream rises from a resurgence at Rickford, the hydrology of which is well documented (Smith & Drew, 1975). A large dry valley representing a former fan head trench runs from Burrington to Rickford (Fig. 2).

The Langford Brook originates at Langford Rising, but this resurgence is not associated with a combe, although contour crenulations suggest that a stream flowed down the Mendip slopes here at one time. There is a series of river terraces associated with Langford Brook which suggests there were formerly higher discharges; the present floodplain has little distinct surface morphology indicating that the channel is likely to have been stable in the recent past.

PRELIMINARY CHEMICAL ASSESSMENT OF SOIL DEVELOPMENT ON BURRINGTON FAN

Because certain soil properties change with time (e.g. B horizon thickness, percentage of organic carbon and iron in a solum), soils are potentially useful relative-age indicators if a soil chronosequence (cf. Jenny, 1941, 1961) can be established i.e. where soil-forming factors at a site, other than time, have been relatively constant. For the Burrington fan soil analysis appeared to offer a complementary method to morphological mapping by which an age framework for Quaternary deposition could be established at the site.

Soil samples were taken from each of the three higher fan units (see Fig. 2 for locations) using a proline corer. In all cases, however, core depth was limited by underlying large boulders. On the Langford unit, coarse gravel at ground level prevented a core being taken. As a result of incomplete core recovery, only small spot samples were available for subsequent analysis. This necessitated using soil chemical properties as a guide to the degree and nature of pedogenesis on the fan surface and, in particular, examining the concentration and distribution of iron oxides within each soil profile, these having been shown by a number of workers to be good indicators of soil age (Brockheim, 1980; Levine & Ciolkosz, 1983).

Iron oxides were selectively extracted from soil samples using sodium dithionite-citrate-bicarbonate to assess concentrations of less active, crystalline "free iron oxides" (Mehra & Jackson, 1960; McKeague & Day, 1966). An increase in the component of dithionite extractable iron within soils is generally believed to reflect the progressive alteration of unstable iron-bearing mafic minerals by soil-forming processes and this has usually been found to correspond with the length of pedogenesis (Alexander, 1974; McFadden & Hendricks, 1985). Iron in the dithionite extract was determined by atomic absorption spectrophotometry and results are given in Table 1.

Mean concentrations of dithionite extractable iron oxides in soils developed on the Link and Ashey fan units are comparable, indicating that these soils are possibly the same age. Concentrations of iron oxides in the Havyat soil, however, are nearly twice as high as those of the Link and Ashey Lane units and suggests that the unit has probably experienced a longer, or more intensive, period of pedogenesis. Unfortunately, without chemical data from the Langford fan unit to see whether the trend in soil chemistry continues, any soil age differentiation must at present be tentative. Nevertheless, the proposed soil chronosequence does support relative-age estimates based on independent morphological mapping.

FAN UNIT	SAMPLE DEPTH (cm)	% DITHIONITE EXTRACTABLE IRON
Link Lane	10-20	1.19
	40-50	1.91
		Mean 1.55
Ashey Lane	10-20	1.04
	40-50	1.31
	80-90	1.81
		Mean 1.39
Havyat	10-20	1.64
	40-50	1.96
	80-90	4.08
	90+	2.25
		Mean 2.48

Table 1. Chemical data for the Burrington Combe fan soils.

DISCUSSION

Although the existence of the fan was documented (Findlay, 1965), its evolution in relation to the geomorphological history of the area was not discussed apart from a tentative suggestion that it might be related to former sea levels (Clayden & Findlay, 1960). The details of the morphology indicate that the fan represents a series of phases of depositional activity. Unfortunately, however, because of the absence of material suitable for dating within the Burrington Combe fan sediments, it has not yet been possible to establish correlations with the geochronometrically dated Quaternary karst chronology proposed for the Mendips by Atkinson and his co-workers (1978). Nevertheless, from an assessment of the soil and landform units identified by the authors at Burrington Combe, a sequence and pattern of alluvial fan development can be inferred.

Link Lane, the highest unit, appears to be the youngest. It demonstrably post-dates the dry channel at the apex of the fan (Fig. 2) as Link Lane sediments infill the area which would be the natural headward course of the channel. An underground channel system which must have given rise to the spring supplying the surface channel is now blocked (Crabtree, 1978), the outlet for springs now being at Rickford and Langford (Fig. 2) where the modern springs dissect the fan gravels.

A temporary section at Bourne (ST 483 598), on the eastern margin of the fan in the Ashey Lane unit has been described in detail by Findlay (1977). The 3.0m deep section revealed 1.5 m of cobbly, matrix-rich gravels overlain by 1.5 m of sandy silt and clay loams. Below 0.5 m, sediments in the section were disturbed and involuted, showing characteristics of cryoturbation and ground ice development possibly under periglacial conditions. In addition, the top

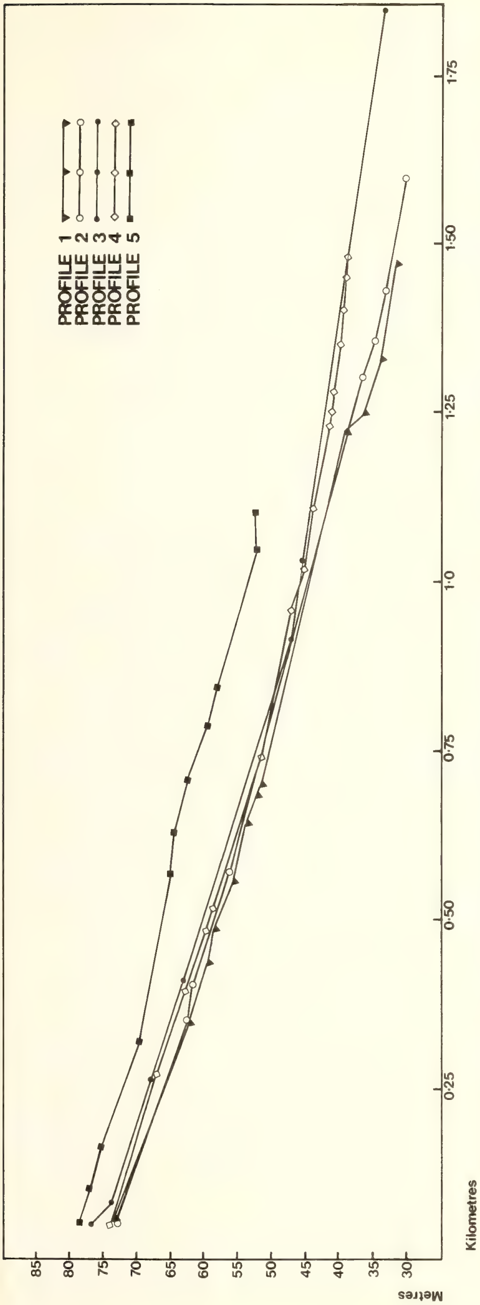

Figure 3. Long profiles at five locations on the fan surface. Positions shown in Fig. 2.

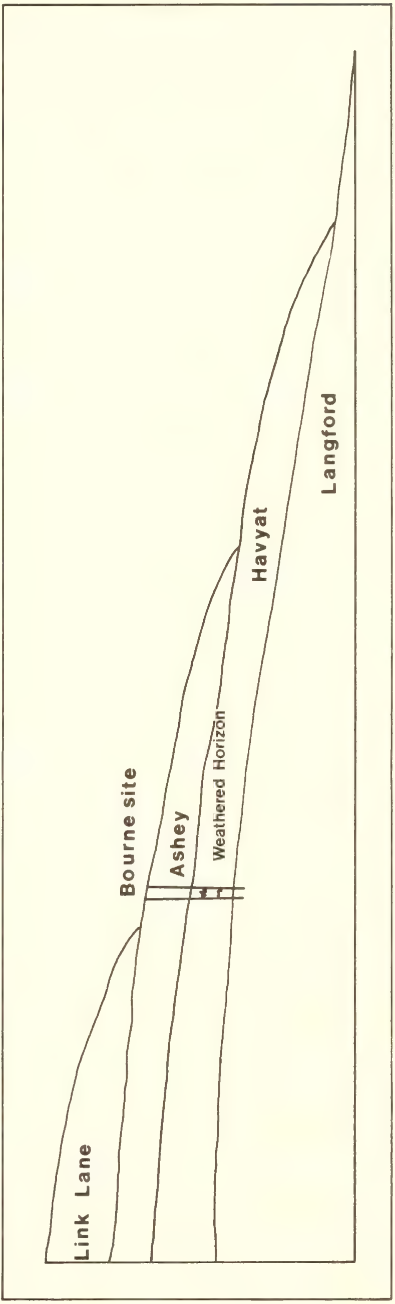
Link Lane
Bourne site
Ashey
Weathered Horizon
Havyat
Langford

Figure 4. Diagrammatic reconstruction of phases of fan development.

1.0 m of the lower gravels was strongly weathered, with all easily soluble minerals having been removed, leaving a matrix consisting almost entirely of alluvial clay. Incorporation of silt into the overlying sandy loams was ascribed by Findlay (*op cit*) both to reworking of loess from the Mendip plateau and to windblown silt deposition contemporaneous with the formation of the fan gravels.

To date, the Bourne site provides the only well-documented vertical section through the Burrington Combe fan. At least two phases of fan sediment are evident, separated by a period of weathering and pedogenesis. This weathered horizon has many internal features diagnostic of a paleosol (cf Valentine & Dalrymple, 1976); red colouration (2.5 YR 4/4), evidence of pedogenic clay and horizontal continuity. It not only cautions against interpreting fan gravels as unitary depositional units, but also indicates the extended Quaternary timescales over which coarse clastic sedimentation must have occurred at topographic situations such as Burrington Combe. On morphological evidence (Fig. 4) the oldest part of the fan is the Langford unit which lies about 5.5 m below the surface of the adjacent Havyat unit. Large Old Red Sandstone cobbles lie near its surface and are similar to those described in the lower layers at Bourne. Calcareous lithologies are absent in the pebble and gravel-size fraction which suggests prolonged exposure to weathering and solutional processes.

CONCLUSIONS

The results of mapping the alluvial fan at Burrington Combe coupled with the investigation of chemical properties of the soils sampled from each mapped unit, indicate that it consists of a series of morphologically distinct depositional units. From their position at the mouth of Burrington Combe and their lithological character, it is apparent that these fan gravels have been derived from the Mendip Hills.

As yet it is not possible to ascribe ages to the individual fan units, but their deposition must have occurred when sediment-supply rates from slopes were increased and when stream run-off was of sufficient magnitude to transport cobble and small boulder-size materials. The movement of coarse clastic debris over the lower slopes of the Mendips suggests the now dry Burrington Combe was functioning as an active erosional and depositional system, with underground channels inactive probably due to the development of permafrost. Climatic and hydrological conditions during the Pleistocene cold stages would have provided an environment conducive to fan gravel accumulation. The weathered horizon in the Bourne section points to a signification interruption in the depositional sequence, possibly even an interglacial.

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The authors would like to thank Mr D.C. Findlay, Dr J.A. Catt and Dr P. Bullock for permission to quote the unpublished material from the Q.R.A. Field Guide and for their interest and discussion in the early stages of the work. Dr R.A. Kemp, Mr J. Rose and Mr P.L. Smart are also thanked for commenting on early drafts of the paper and Mr B. Parsons for help with surveying. A grant towards cost of levelling assistants was provided by Bristol Polytechnic Research Fund. M.G.M. is grateful to the University of Wales for the provision of a research studentship during which this work was carried out and to Prof. C. Kidson for his advice and encouragement. Naomi Cottell and Sue Porter are thanked for assistance with diagrams.

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AVON AND DISTRICT ENTOMOLOGICAL REPORT, 1985

Compiled by the Recorders of the Entomological Section

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As will be seen from the following sections of this report, a poor summer made observing difficult, with the result that the volume of records received was lower than in most recent years for most orders of insects. The Section was therefore grateful to the Bristol Environmental Records Centre (BRERC) for the continued exchange of information. In 1985, more observers contributed to the BRERC Common Butterfly Survey, which went some way towards redressing the shortfall of records from the Society's own members. This does not disparage the efforts of the latter which, considering how difficult it was to get out and about during the summer, showed a continued devotion to their respective subjects.

The records contained in this report refer to the vice-counties 6 and 34, except for that area of the latter to the west of the Severn. Many of the sites and localities mentioned are listed in the reports for 1982 and 1984.

If extensive excursions into the countryside were sometimes out of the question, some members demonstrated that rewards are to be had by looking closely at what is near at hand. One put to excellent use spare minutes during his lunch breaks by visiting open spaces and waste ground in Bristol City centre, thereby showing that the inner areas are by no means a desert. He noted a number of Vanessid butterflies there as well as various whites and assorted ladybirds. Bristol is well endowed with open spaces and numbers of records have been received from such sites as Arno's Vale and Snuff Mills. Probably there is still much to be discovered in all types of habitat within the city boundaries.

Some records are still submitted on sheets of paper instead of on the freely available standard record cards, so causing the Recorders significant extra work in transcription.

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WEATHER SYNOPSIS (compiled by A.H. WEEKS)

The general impression of 1985 was of a pretty miserable year. Impressions can be misleading but, in this instance, the weather data bear out most of them. The two bitter spells, one in January and the other in mid-February, are easily remembered, but these tend to obscure the memory of an exceptionally fine spell at the end of February, making this February the first one since 1961 when the temperature exceeded 60°F (15.5°C). We may remember the spring as cool and wet, but in fact, although this description is true of March, it was followed by two months which were statistically very near normal, so that the season as a whole was only a fraction of a degree cooler than average with rainfall just average. The summer was substandard but, sandwiched between an exceptionally poor June and an almost equally appalling August, was a warm if slightly wet July. The first two autumn months made some amends, being both warm and dry. The number of days on which rain fell totalled 48 out of a possible 92 in the spring, 52 out of 92 in the summer and 31 out of 92 in the autumn.

In more detail, the year started with two cold months. January day-time temperatures were 3.3°C below normal and February's 1.0°. Both months were slightly drier than the seasonal average. The key months for insect activity, from March to October, presented, overall, a rather dismal picture. March was cooler by nearly 1.0° and it was wet at 125% of average rainfall, which more than offset the benefit of a slightly better than average sunshine record. April was slightly warmer (0.5° up) and drier (80% rain) but it was deficient in sunshine. May was a near normal month on all counts. Of the three summer months, June yielded about 225% of rain, July nearly 110% and August 170%, while daytime maxima of temperature were nearly 1.5° below normal in both June and August, but 1.0° above in July. Sunshine figures exceeded the average only in July, the others being in the range 85-90%. The autumn started well, with a welcome warmth to the sunshine in September and early October and again at the very beginning of November, which kept the season going. All three months were very dry (45%, 60% and 50% of normal rainfall). September's day temperatures were about 1.5° above average and October's a little above but, after the fair start (and although it remained sunny), November became cold and ended nearly 2.0° below average. Activity almost ceased after the first week.

Surprisingly, rainfall for the calendar year amounted to about 105% of average, so it was by no means excessively abnormal. Indeed, it has already been suggested that 1985 was a return to a more usual pattern of weather after a series of dry summers which began in the mid-60's. (N.B. The figures quoted above are derived from the records of a climatological station at Yatton, a Meteorological Office registered station).

BUTTERFLIES (*Lepidoptera*) by G.W. SORRELL & A.H. WEEKS

Of recent years, 1985 offered the least favourable conditions for butterfly recording. As can be seen from the data given in the weather synopsis, rain fell on more than half of the days in spring and summer (100 out of 184, against 56 in 1984 and 86 in 1983) and therefore reduced the opportunities for outdoor observation. Such opportunities to observe butterflies in their characteristic habitats (Purple Hairstreaks around their parent oaks or Greylings on open rocky slopes) were yet further restricted by the strong winds which blew on the few really clear and warm sunny days. Accordingly, records of these two species are well down on 1984.

As has been seen in the past (eg. in 1982) extreme cold does not affect these insects to any appreciable extent and the fine days at the end of February and the beginning of March, which followed closely on the end of the second freeze-up, brought out the hibernators and raised false hopes.

Thereafter the weather became unkind to insects and observers alike. Extremely wet conditions which occurred in March put back the season by between two and three and a half weeks, notably in the case of the Small Copper, Marbled White and Gatekeeper. Subsequently, the wet summer conditions had an extremely adverse effect on all the Skippers and on the summer broods of Common Blue, Holly Blue and Brown Argus. The Fritillaries also suffered. Partially offsetting these disappointments was a small influx towards mid-April of Red Admirals, Painted Ladies and some moths. These Painted Ladies and their offspring gave us sightings in all ensuing months until October, a satisfaction denied us in 1984. The Red Admirals did not fare so well and, as the main summer immigration seems to have been weak, their numbers were well down on previous years. There was not one record of a Clouded Yellow in the two vice-counties.

To sum up, all the expected species appeared (except the Clouded Yellow) but, in most cases, in much reduced numbers.

Our thanks go again to the staff of BRERC who provided an appreciable proportion of the records received.

Scientific and vernacular names, also the order of species, follow those given in the check list by Higgens & Riley (1975).

Pieris brassicae (Large White) Common but perhaps not in such large numbers as in recent years. First seen 19 April, last 14 October. Most numerous July-August.

Pieris rapae (Small White) Common throughout the season. First seen 6 April, last 25 October. Most numerous early June and late August.

Pieris napi (Green-veined White) Seen in fair numbers in the spring but in smaller numbers in late summer brood. First seen 17 April, last 28 September. Largest numbers recorded, ten at Saltford, 27 July.

Anthocaris cardamines (Orange Tip) Widespread in reasonable numbers after a slow start. First seen 24 April, last 17 June, except for a late sighting of a female near Brent Knoll on 3 July. Highest counts:- abundant in Frome Valley, Stapleton, 16 May and at Westonbirt Arboretum, 18 May; nine, Cadbury Hill, 28 May; four, Goblin Combe, 31 May.

Gonepteryx rhamni (Brimstone) After an early emergence on warm days at the end of February there were good numbers in spring over the entire area; less satisfactory numbers in late summer and autumn, but with two exceptionally late appearances at year end. First seen 24 February in many parts of the county, last seen 13 October except for individuals seen in flight on 23 December, a male near Hawkesbury Upton and a female in garden at Yatton. Largest numbers:- ten at Snuff Mills, Stapleton, 30 March; seven, Goblin Combe, 31 March; 'abundant', Snuff Mills, 18 April; eleven, Cadbury Hill, 2 May; twenty, Goblin Combe, 7 May; thirteen, Dolebury Warren, 17 May; eighteen, Goblin Combe, 31 May and five, Steep Holm, 7 September.

Limenitis camilla (White Admiral) A reasonable season at Lower Woods, Wetmoor NR and Shapwick NNR. First seen 9 July, last 17 August. Also six at Street Heath, near Street, 20 July; five, Lord's Wood, near Hunstrete, 21 July.

Inachis io (Peacock) Noted all over the area. Numbers not outstanding in spring but there was a good summer brood. First seen 5 March, last 22 October. Largest number:- 'abundant', Snuff Mills, Bristol, 18 April; twelve, Goblin Combe, 19 April; over thirty, Goblin Combe, 17 August; over thirty, Arno's Vale Cemetery, 21 August; thirty, Congresbury, 7 August.

Vanessa atalanta (Red Admiral) A relatively poor year, despite a small influx in April. The main immigration in summer appears to have been weak. First seen 27 February at Dundry and Lower Kilcott, last seen in flight 3 November (although a dead specimen was found in Bristol on 21 December). Nearly all seen in ones and twos, otherwise four at Yatton on 29 August; ten on Steep Holm, 7 September.

Vanessa cardui (Painted Lady) Following the small influx in April, seen in varying numbers in every month until November. First seen 17 April, last 7 November. Largest numbers:- three, Goblin Combe, 31 May; four, Cadbury Hill, 13 July; up to four, Congresbury, 11-15 September.

Nymphalis polychloros (Large Tortoiseshell) Noted at its site near Flax Bourton in April.

Aglais urticae (Small Tortoiseshell) Quite reasonable numbers in spring, followed by a good summer brood. First seen 27 February, last 15 November, except for a single, 6 December. Largest number:- over twenty on Cheddar Valley Railway track, Yatton, 7 July; twenty, Cadbury Hill, 13 July; abundant, Arno's Vale Cemetery, Bristol, July-August; over one hundred, Steep Holm, 7 September; over thirty, Congresbury, 29 August and forty to fifty, same place, 7-25 September; about one hundred on *Aster* sp. on River Avon bank, Shirehampton, 25 September.

Polygonia c-album (Comma) Widely but rather thinly distributed over the area. First seen 10 April, last 21 October. Most numerous in July and August, the largest numbers noted being:- four, Goblin Combe, 19 April; four, Cadbury Hill, 13 July; seven, Goblin Combe, 20 July; four, Snuff Mills, 17 August.

Argynnis paphia (Silver-washed Fritillary) Seen in fair numbers at Lower Woods, Wetmoor NR, otherwise in relatively small numbers. First seen 3 July, last 31 August. Largest number (except Wetmoor), about fifty, Great Breach Wood, Compton Dundon, 27 July; four, Goblin Combe, 20 July; three, same place, 17 August.

Mesoacidalia aglaja (Dark Green Fritillary) Rather scarce. First seen, 2 July, last 17 August. Highest numbers: seventeen, Dolebury Warren, 13 July; five, Burrington Common, 23 July; noted also at Draycott Sleight, Charterhouse-on-Mendip, Crook Peak and Goblin Combe.

Fabriciana adippe (High Brown Fritillary) Still very scarce. Two seen, Burrington Common, 4 July; also noted Great Breach Wood, 25 July.

Clossiana euphrosyne (Pearl-bordered Fritillary) Only records: five, at Great Breach Wood, 9 June and seventeen, same place, 10 June.

Clossiana selene (Small Pearl-bordered Fritillary) Scarcer than in recent years. First seen 2 June, last 13 July. Six noted, Crook Peak, 2 June; four, same place, 16 June and two, 2 July; fifteen, Charterhouse-on-Mendip, 4 July. Also recorded at Dolebury Warren, Cheddar, Ashcott and Priddy in varying numbers.

Euphydryas aurinia (Marsh Fritillary) Reported from nine sites. First noted 2 May, last 4 July. Highest count, twelve, Shapwick Heath NNR, 29 May; many at Ashcott Heath, 1 June; one at Charterhouse-on-Mendip, 8 June and two, same place, 4 July; four, Great Breach Wood, 9 June.

Melanargia galathea (Marbled White) A reasonably good season. First seen 25 June, last 26 August. Most numerous:- about one hundred, Kingston Seymour and over fifty, Cheddar Valley Railway track, Yatton Station, both 7 July; over twenty five, Cadbury Hill, 13 July; over forty, Goblin Combe NR, 20 July.

Hipparchia semele (Grayling) Only a few reports received, with numbers smaller than in recent years. First seen 13 July, last 6 September. Highest counts:- ten, Draycott, 1 August; six, Goblin Combe NR, 17 August; six, Trooper's Hill, Hanham, 18 August. Other sites include Dolebury Warren, Middle Hope and Brean Down.

Maniola jurtina (Meadow Brown) Common but numbers slightly reduced. First seen 2 June, last 28 September. Most Numerous:- over fifty, Cadbury Hill, 1 July; over fifty, Goblin Combe, 2 July; over one hundred, Draycott Sleight, 1 and 3 August; abundant, King's Weston Down, Henbury, Bristol, June to August and Arno's Vale Cemetry, Bristol, July and August.

Aphantopus hyperanthus (Ringlet) Less common than in recent seasons, although still widely distributed. First noted 27 June, last 29 August. Highest numbers:- over fifteen, Cadbury Hill, 13 July; over fifty, same place, 24 July; over ten, Burrington Common, 23 July; about fifty, Saltford, 27 July.

Pyronia tithonus (Gatekeeper) Widespread but not quite as numerous as in 1983 and 1984. First noted 7 July, last 29 September. Most numerous mid-August. Highest counts over one hundred, Cadbury Hill, 10 August; over fifty, Goblin Combe, 17 August; abundant, Arno's Vale Cemetry, 21 August and Purton near Berkeley, 29 August.

Coenonympha pamphilus (Small Heath) A further reduction in numbers compared with previous years. First seen 30 May, last 5 October. Highest numbers:- over 40, Goblin Combe NR, 2 July; over fifty at Charterhouse-on-Mendip and at Dolebury Warren, 4 July; about fifty, Cheddar, 4 July; smaller numbers, Burrington Common, 4 and 23 July.

Pararge aegeria (Speckled Wood) A comparatively poor year but still widespread over the area. First seen 18 April, last 13 October. Largest numbers:- Goblin Combe, 31 May-1 June; fifteen, Great Breach Wood, 9 June; common at Purton, 29 August

Lasiommata megera (Wall Brown) Rather scarce, very few records received in spring and even fewer in late summer. First seen 17 May, last 8 September. Highest count:- ten at Walton Hill, Street, 26 August; singles noted at Dolebury Warren, Middle Hope and Goblin Combe, 17-31 May and Weston-super-Mare, 7 September.

Hamaeris lucina (Duke of Burgundy Fritillary) Fared reasonably well at known sites between 18 May and 10 June. Thirty seen, Midger Wood, late May; two at Great Breach Wood, 9 June.

Thecla betulae (Brown Hairstreak) Single record received of five at Walton Hill, Street, 26 August.

Quercusia quercus (Purple Hairstreak) A very poor season; reported from two sites only. Portishead, 20 and 23 July; three at Dundon Beacon, Compton Dundon, 1 August.

Callophrys rubi (Green Hairstreak) Appeared in reasonable numbers in its usual locations but had a short, late season. First seen 7 May, last 4 July. Most frequent at Charterhouse-on-Mendip, 8 June; nine at Ashcroft, 2 June.

Strymonidia w-album (White-letter Hairstreak) Single report, Saddlewood (Midger Wood), 27 July.

Lycaena phlaeas (Small Copper) Still rather scarce and all records are of small numbers. First seen 11 May, last 29 October. Most numerous:- Middle Hope, four, 11 May; twelve, 29 May and 5 on 8 June; also five at Barrow Gurney, 30 May; also noted at Cadbury Hill, Dolebury Warren, Goblin Combe, Inglestone Common, near Wickwar and Walton-in-Gordano.

Aricia agestis (Brown Argus) Numbers in the spring brood were possibly near normal but the summer emergence was very small. First seen 7 May, last 9 September. Most numerous:- over one hundred, Goblin Combe NR, 31 May; five, same place, 6 September; twenty eight at Pendon, 15 June; also noted at Crook Peak, Kingsweston Down, Middle Hope, Cadbury Hill and Dolebury Warren.

Cupido minimus (Small Blue) Appears to have suffered a catastrophic drop in numbers. First noted 10 June, last 26 August. Reported from only four sites:- Worlebury Hill, near Weston-super-Mare; Dolebury Warren; Draycott and Wotton-under-Edge, with not more than two individuals on any day.

Celastrina argiolus (Holly Blue) Widespread but numbers remaining small, more numerous in spring than in summer. First seen 26 April, last 26 September. No record of more than three at any of the sites which include Middle Hope, Cadbury Hill, Goblin Combe and Walton Hill, Street.

Lysandra coridon (Chalkhill Blue) An exception in that this species seems to have had a good year, with some hundreds flying at the beginning and end of August at Draycott. Only other reports were from Uphill, near Weston-super-Mare, 17 August; Brean Down and Saddlewood, Midger Wood. (No reports from Bannerdown, near Bath).

Polyammatus icarus (Common Blue) Like the Brown Argus, this species was seen in good numbers in the spring but was scarce in late summer. First seen 18 May, last 5 October. Most numerous:- over one hundred, Goblin Combe NR, 31 May; fifty, Midger Wood, 2 June; abundant, Kingsweston Down, 20 June; ten, Charterhouse-on-Mendip, 6 and 16 June; eight, Dolebury Warren, 4 July. The largest numbers noted in the second brood was six, Goblin Combe, 6 September.

Pyrgus malvae (Grizzled Skipper) A very poor season, most reports being of singles. First seen 3 May, last 7 July. Highest counts:- four, Dolebury Warren, 7 May and six, Cleaves Wood, near Wellow, 10 June. Other reports were from Crook Peak, Charterhouse-on-Mendip, Great Breach Wood, Ashcott Heath, Shapwick Heath, Goblin Combe, Wetmoor NR, Velvet Bottom and Midger Wood.

Erynnis tages (Dingy Skipper) Very scarce. First noted 11 May, last 3 July. Reported from Crook Peak, Dolebury Warren, Goblin Combe, Ashcott Heath, Priddy and Cheddar in small numbers. Highest count, fifteen, Midger Wood, 2 June.

Thymelicus sylvestris (Small Skipper) Numbers very much reduced compared to 1984. First noted 4 July, last 7 September. Highest counts:- over ten, Cheddar Valley Railway line, near Yatton Station, 7 July; over ten, Cadbury Hill, 13 July; twelve, same place, 24 July; twenty, Draycott, 1 August and twenty five, same place, 3 August; fifteen, Charterhouse-on-Mendip, 26 August.

Thymelicus sylvestris (Essex Skipper) Some, flying with Small Skippers, Charterhouse-on-Mendip, 10 August.

Ochlodes venata (Large Skipper) Not very numerous. First seen 30 June, last 23 July - a comparatively short season. Highest counts:- fifteen, Cadbury Hill, 1 July; over twenty, Goblin Combe, 2 July; thirty, Portbury Wharf, 3 July; common, Arno's Vale Cemetery, Bristol, 10 July; also seen at Charterhouse-on-Mendip, Burrington Common, Dolebury Warren, Lord's Wood and Great Breach Wood, Compton Dundon.

MOTHS (*Lepidoptera*) by K.H. POOLE

The disappointing weather and generally poor season in 1985 was reflected in the considerably lower number of records than in previous years. Hopes were raised by the finding of a Striped Hawk-Moth in Claverham in April but, apart from one Hummingbird-Hawk Moth, a Bordered Straw and of course some Silver Y, no other migrant moths were noted. However, the season ended spectacularly enough with the appearance of a Clifden Nonpareil in Yatton; apparently the first record of this large moth for our area since 1880 (at Abbots Leigh).

A few individuals of the Fen Wainscot were found in 1984 at Priddy Pool and this year it was common at night there towards the end of August, confirming it as a resident species and constituting a westerly extension from its known range in S.E. England. Names are in accordance with J.D. Bradley and D.S. Fletcher, *A Recorder's Log-book of British Butterflies and Moths*, 1979.

Sphinx ligustri (Privet Hawk-Moth) Congresbury, 12 August (GWS).

Macroglossum stellatarum (Hummingbird Hawk-Moth) Weston-S-Mare, 24 and 26 July (RA).

Hyles lineata (Striped Hawk-Moth) Claverham, 15 April (AHW).

Tethea ocularis (Figure of Eighty) Weston-S-Mare, 2 July (CSHB).

Eriogaster lanestris (Small Eggar) Congresbury, 8 June, two nests of larvae (GWS).

Bena prasinana (Scarce Silver Lines) Bristol, Wine St., 31 July (GWS).

Atolmis rubricollis (Red-necked Footman) Weston-S-Mare, 3 July (3) (CSHB).

Chilodes maritimus (Silky Wainscot) Berrow, late September (a very late appearance) (CSHB).

Siderides albicolon (White Colon) Berrow, 13, 29 June (several) (CSHB).

Mythimna obsoleta (Obscure Wainscot) Priddy Pool, 12 July (KHP).

Arenostola phragmitides (Fen Wainscot) Priddy Pool, 22, 28 August (common) (CSHB).

Lithophane leautieri (Blair's Pinion) Weston-S-Mare, 13 October (2) (CSHB).

Heliothis pettigera (Bordered Straw) Weston-S-Mare, 11 September (CSHB).

Catocala fraxini (Clifden Nonpareil) Yatton, 26 August (HJM).

Ectropis consonaria (Square Spot) Weston-S-Mare, late May (CSHB).

DAMSELFLIES AND DRAGONFLIES (*Odonata*) by S. RANDOLPH

From the pleasing number of records received (a third as many again as last year) and various comments from recorders, it is clear that, although several species were noticeably late in appearing on the wing, their normal flight periods tended to be extended further into the season than usual. Numbers of many species were well up and it would probably be true to summarize the 1985 season as being a good one for *Odonata*.

The number of records for each species refers to those received for the 1985 season only.

The vernacular and scientific names used and order of species follow the check list given by Keen (1977). N.B. *Sympetrum scoticum* is referred to in the latest literature as *S. danae*. The records are for Somerset and Avon except for those marked (G) for Gloucestershire.

For those wishing to find out more about the distribution and status of our local *Odonata*, reference should be made to the recent publication *An Atlas of the Dragonflies of the Bristol Area* (S. Randolph, 1986) available from the City of Bristol Museum.

Zygoptera (Damselflies)

Platycnemis pennipes (White-legged Damselfly) Three records including smallish numbers at a new breeding site, Tucking Mill, Monkton Combe (JH). Several flying between Friary Wood and the river, near Freshford (RSC).

Pyrrhosoma nymphula (Large Red Damselfly) 23 records. New breeding sites include: common at Walton Moor, 31 May (SR); Portbury Wharf, 3 July; Avonmouth, 26 June (AH); Lord's Wood, near Pensford (JH).

Ischneura elegans (Blue-tailed Damselfly) 44 records. Several new breeding sites including Lord's Wood (RSC & JH); Hill near Berkeley (G) (SCH). Small numbers, Tucking Mill (JH);Henleaze, single female, colour form *rufescens*, with orange thorax, 12 July (RHP).

Enallagma cyathigerum (Common Blue Damselfly) 25 records. New records include: Portbury Wharf, 3 July; Long Ashton, 4 July (AH); Max Meadows, Winscombe, 7 July (RSC); Hill (G) (SCH); Lord's Wood (JH & RSC); Tucking Mill (JH).

Coenagrion puella (Azure Damselfly) 40 records. New sites include:- several, farm pond, Rockhampton (G), 27 July (SR); Duckhole, several, 27 July (SR); cattle pond, Black Rock, Cheddar (JMB); rhynes W. of Yatton, 13 July (JMB); Avonmouth Sewage Farm (G), 26 June (AH); many rhynes around Portbury Wharf.

Coenagrion pulchellum (Variable Damselfly) 6 records but no new ones for this very local species. Theale Moor, 20 males, 4 June; Cheddar Moor, 20+ males, 4 June; Chilton Moor, 20+ males, 29 June; Chilton Bridge, near Birtle, 6+ females, 27 May (JMB).

Erythromma najas (Red-eyed Damselfly) 3 records. Tucking Mill, small numbers at this new breeding site (JH); several, Hunstrete Lake, 21 July (RSC); Priddy Mineries (JMB).

Lestes sponsa (Emerald Dragonfly) 6 records of which two are now breeding sites for this scarce species. A good colony at Lord's Wood (JH) and many, Portbury Wharf, 3 July (AH); unusually good numbers at one of its best known sites, Priddy Mineries (JMB).

Calopteryx virgo (Beautiful Demoiselle) 3 records for this very local species. Several along Withiel Combe, S.E. of West Pennard (JMB); small numbers breeding on Wellow Brook, Midford (JH); single male at Bathampton, 9 June (RSC).

Calopteryx splendens (Banded Demoiselle) 7 records. Few on R. Yeo at Nailsea, 15 August (AH); many at New Bridge, R. Avon, 26 August (RSC); small numbers, Wellow Brook, Midford (JH).

Anisoptera (Dragonflies)

Cordulegaster boltonii (Golden-ringed Dragonfly) 3 records. This handsome dragonfly is rarely noted in the Avon area so that three records for a single season is most unusual. One male patrolling near small stream, Blackdown, Mendip (the observer was almost certain there were two males), 1 August (JMB); one female hawking around compost heap in garden, Clevedon, 25 July (KB); one (probably female) in garden, Westbury-on-Trym, late August or early September (NJG).

Brachytron pratense (Hairy Dragonfly) 11 records. Limebreach Wood, one male hawking at edge of woodland, 2 June (SR). Two new breeding sites:- Portbury Wharf, several females ovipositing, 3 July (AH); Burtle/Tadham Moor, pair mating (JH). A very late record, a single male hawking along rhyne, 27 July (RSC).

Aeschna cyanea (Southern Hawker) 20 records. 26 emerged from ponds in garden, Stockwood, Bristol (JH); 3 + exuviae found on one day and up to 4 females seen on subsequent days, Lord's Wood (JH).

Aeschna grandis (Scarce Hawker) 5 records. About ten, including 3 females ovipositing in old gravel pit near Witham Friary (JMB). Two males throughout July but no females, Lord's Wood (JH). Also Catcott Heath, Westhay Heath (JMB).

Aeschna juneae (Common Hawker) 5 records. Three from known breeding sites, Priddy Mineries, Black Moor, Blackdown, all Mendips (JMB). Two are from new sites but very unlikely to be breeding records. One nearly emerged, old gravel pit, near Witham Friary, Withiel Combe, West Pennard (JMB).

Aeschna mixta (Scarce Hawker) 10 records. Nearly all these records are from the Somerset levels, e.g. Walton Heath, Shapwick Heath, Chilton Moor, Catcott Heath (JMB). A teneral specimen was seen to be taken by a female *Anax imperator*, Ashton Court (JH).

Anax imperator (Emperor Dragonfly) 15 records. Several new breeding sites including Portbury Wharf (many seen) and Avonmouth Sewage Works (several), 3 July (AH); 50 exuviae found on one day at Lord's Wood (JH); up to 7 males at one time but no females, Shapwick Heath (JH); Up to 5 females noted at Witham Friary gravel pits (JMB); 3 over pool, Lord's Wood, 21 July (RSC) and single male at Littleton Brick Pits (AWT Reserve), 29 September (RHP).

Cordulea aenea (Downy Emerald) 2 records. Both for a pool at Priddy which is the only breeding site in the Avon/N. Somerset area. One found emerging on 24 May (JMB). On 1 July one pair were seen pairing (JMB). Numbers have been dropping over the last four seasons and the small colony at this site may be in danger of extinction.

Orthetrum cancellatum (Black-tailed Skimmer) 11 records. High numbers were reported from Chilton Moor and good numbers at Shapwick Heath (JH). New sites, where it clearly breeds, are at Portbury Wharf, Avonmouth Sewage Farm and possibly Long Ashton. At least 3 males seen, Witham Friary gravel pits (JMB).

Libellula depressa (Broad-bodied Chaser) 26 records from various sites throughout the recording area. Many, including several females, ovipositing at Portbury Wharf, 3 July (AH); several, old cattle pond, Black Rock, Cheddar (JMB); Walton Heath; Axbridge Moor; Catcott Heath (JMB); good numbers this season, Ashton Court (JH); two females, one teneral, Walton Moor, 31 May (SR); three males and one female, small pond, Hartcliffe, 5 June (SR).

Libellula quadrimaculata (Four-spotted Chaser) 17 records, mainly from its stronghold on the North Somerset levels. Theale, Cheddar, Chilton and Stoke Moors (JMB); up to 12 males and several females, Lord's Wood (JH).

Sympetrum sanguineum (Ruddy Darter) 18 records. Most of these are for the North Somerset levels including Ashcott Heath, Chilton Moor (JMB), Catcott Heath, Westhay (JMB, RSC) and Shapwick Heath (JH). Good breeding colony at Lord's Wood (JH); possibly new breeding site at Burtle Moor, where quite a few males seen (JH).

Sympetrum scoticum (Black Darter) 3 records. Unusually good numbers, Priddy Mineries (JMB); old mining pool, East Harptree Wood, Blackdown, 1 August (JMB).

Sympetrum striolatum (Common Darter) 34 records including ten 1 km squares in Portbury Wharf area where hundreds were reported (AH). Probably more than 250 at Shapwick Heath NNR, mostly females but numerous pairs in copulation, 20 October (JH, RHP).

REFERENCES

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BEETLES (*Coleoptera*) by R.W. ROWE

The wet and very variable weather experienced during the so called 'high summer' months of 1985 was probably responsible for the fact that reports were received from only five observers. As a result nothing of rarity was reported and again we had an almost complete absence of observations in the 10 km squares immediately to the north and east of the City of Bristol. It would be encouraging to find reporters during 1987 moving around a little more from their 'home' territories so that the overall picture presented could be more representative.

Again we have to report an almost complete absence of reports of the two species for which a special watch is kept - *Clytus arietis*, the Wasp Beetle and *Staphylinus olens*, the Devil's Coach Horse.

A sample of some of the more interesting reports is as follows. The nomenclature is that given in Kloet and Hincks *A Check List of British Insects* Vol. XI, Pt. 3, 2nd Ed, 1977.

Saprinus cuspidatus One from carcase of dog, Berrow Dunes, 18 May (RSC). This is not recorded by Wilson in his *Coleoptera of Somerset*.

Silis ruficollis Three from reed bed, Berrow Dunes, 13 July (RSC).

Staphylinus globulifer One under stone, Middle Hope, 13 April (RMP).

Hydroporus incognitus A few in rhynes, Westhay Moor, 11 May (RSC).

Helochares lividus A few in rhynes, Westhay Moor, 14 September (RSC).

Orsodacne cerasi Several on hawthorn, Axbridge, 19 May (RSC).

Philonthus decorus One in grass tuft, Charterhouse-on-Mendip, 30 January (RMP).

Anthicus antherinus One found in Brussels Sprouts on allotment, Congresbury, 13 January, (RWR).

Bruchus loti One from *Vicia sepium*, Lord's Wood, Hunstrete, 21 July (RSC).

Curculio rubidus One found on birch on Nature Reserve, Westhay Moor, 31 August (RSC).

Ontholestes murinus One under bark, Chew Valley Lake, 3 February (RMP).

Bembidion harpaloides One under bark, Chew Valley Lake, 3 February (RMP).

LADYBIRDS (*Coccinellidae*) by K.W. MILLER

A good year for ladybirds with reports of very large numbers of the common 7-spot and smaller numbers of the 2-spot and 14-spot. Other records received included the following:-

Adalia 10-*punctata* Temple Way, Bristol, 16 March and Winterhead Wood, Shipham, 18 May (RWR).

Calvia 14-*punctata* 6 and 8 May by beating hawthorn (RWR) and 19 May, Axbridge, on hawthorn (RSC).

Coccinella 11-*punctata* One on house wall, Congresbury, 5 April (RWR).

Exochomus quadripustulatus One at Temple Way, Bristol, in bushes, 18 April (RWR). Several on conifers (a more usual habitat) at STNC Reserve, Westhay Moor, 31 August (RSC).

Subcoccinella 24-*punctata* Plentiful, East Harptree Combe, 17 August (RSC).

TRUE BUGS (*Hemiptera/Heteroptera*) by R.S. CROPPER

The following is a selection of the more interesting records in 1985. Records are all by RSC and refer to single specimens unless otherwise stated.

Elasmostethus interstinctus On hawthorn, Catcott Heath, 26 May.

Piezodorus lituratus Three on gorse, Purn Hill, Bleadon, 20 April.

Picromerus bidens On wood sage, *Teucrium scorodonia*, East Harptree Combe, 17 August.

Ischnodemus sabuleti Plentiful on emergent vegetation in rhyne, Tealham Moor, 27 July.

Metatropis rufescens From mixed vegetation by towpath, Leigh Woods, 13 June.

Nabis ferus From verge of track, Rowberrow, 29 September.

Nabis ericetorum Several adults and nymphs on heather, Westhay Moor, 31 August.

Orius laevigatus On gorse, Purn Hill, 20 April.

Cardiasthetus fasciiventris Two on gorse, Purn Hill, 20 April.

Hoplomachus thunbergii In flower head of mouse ear hawkweed, Dolebury Warren, 15 June.

Pachylops bicolor Several on gorse, Black Rock, Cheddar, 12 October.

Miris striatus On wall of house, Burnham-on-Sea, 12 June and a further three beaten from nearby hawthorn hedge, 19 June.

Phytosoris reuteri From hawthorn, Burledge Hill, Bishop Sutton, 8 September.

Chartoscirta cincta On grass in shady rhyne, Westhay Moor, 14 September.

Notonecta maculata Several in cattle trough, Draycott, 27 October.

GRASSHOPPERS AND CRICKETS (*Orthoptera*) by K.W. MILLER

Records were received for eight species:-

Meconema thalassinum (Oak Bush-cricket) Nymph, Leigh Woods, 8 June (JFB). Adults on oak, Dolebury Warren, 7 September (RSC)*.

Tettigonia viridissima (Great Green Bush-cricket) Several in old quarry, Uphill, 24 August (RSC). Heard and seen in good numbers at Draycott, Mendip, 3 August and at Walton Moor Reserve, 7 September when visited by the Section (KWM).

Conocephalus dorsalis (Short-winged Conehead) Several at Walton Moor Reserve, September (KWM).

Stenobothrus lineatus (Stripe-winged Grasshopper) Singing in good numbers on southern slopes of Dolebury Warren, 7 September (RSC)*.

Omocestus rufipes (Woodland Grasshopper) Great Breach Wood, singing in good numbers along woodland rides and clearings, 7 September (RSC).

Myrmeleotettix maculatus (Mottled Grasshopper) Dolebury Warren, several males, 15 June (KWM).

Chorthippus albomarginatus (Lesser Marsh Grasshopper) Common, Walton Moor Reserve, 7 September (KWM).

Note: Starred items refer to new 10 km square records.

TRUE FLIES (*Diptera*) by R.M. PAYNE and S. RANDOLPH

Syrphidae (Hoverflies) by S. RANDOLPH

A recent publication by the Nature Conservancy Council (Falk, 1985) has attempted to identify, using four categories, those British *Diptera* which are endangered, vulnerable, rare or notable species. While none of the hoverflies seen locally this year have fallen into the first three categories, six species have been recorded which are considered as 'notable' in national terms i.e. known from 100 or less post-1970 10 km squares. These six species are:-

Tropidea scita This is a very local species in the Avon area. Audcent (1948) gives only one record, at Ashcott, Somerset. It is closely associated with open fen/lush marsh habitat. It was found last year in the AWT reserve at Littleton Brick Pits and this year has been discovered at two more sites, both in the Gordano Valley: Walton Moor, abundant; Weston Moor (AWT Reserve), quite common, 31 May.

Platycheirus ambiguus This species is generally associated with blackthorn (*Prunus spinosa*) in full blossom and is rarely found after early June, with populations peaking in late April. Audcent (1948) does not list this species. All three records refer to the same site at different dates.

Hawkfield Meadows, Hartcliffe (due for industrial development). First noted on 30 April, where several males were hovering 2-3 m above the sheltered side of a mixed hawthorn/blackthorn hedge. Last seen on June 5th when a single female was taken.

Volucella zonaria A single specimen of this very large hoverfly was seen by hemp agrimony flowers in Temple Way in the centre of Bristol in August (RWR).

The remaining 'notable' species will all be considered in relation to the site at which all three were found, namely Friary Wood, 1 km south of Freshford.

Friary Wood has been visited only twice, on both occasions for not more than an hour or so. 18 species have been recorded in and immediately adjacent to the woodland.

Three of the species are considered to be of 'notable' status (see Table 1). In addition, reference to Stubbs' (1982) provisional list of 46 hoverflies which can be used to indicate primary woodland, identifies five out of the 18 species as primary woodland indicator species.

	NOTABLE SPECIES (see text)	PRIMARY WOODLAND INDICATOR SPECIES
Epistrophe diaphana	*	
Epistrophe grossulariae		*
Criorhina berberina var. *oxyacantha*	*	*
Ferdinandea cuprea		*
Portevinia maculata		*
Volucella inflata	*	*

Table 1. Species recorded in Friary Wood, near Freshford.

All the species in the table were recorded on 16 June, 1985. What is particularly significant about this list is that nearly a quarter of the species so far found in this wood can be categorised as primary woodland indicators. Further visits will undoubtedly lead to the discovery of many more species. It is likely that some of these will be indicator species.

The Leigh Woods area of Bristol has, after several years of sugaring, yielded a total of 64 species of hoverfly (R.H. Poulding, pers. comm.). 7 of these are 'primary woodland' indicators. Stubbs (1982) refers to Hayley Wood, Cambridgeshire as a well recognised example of ancient woodland. It possesses 5 indicator species. Monks Wood (NNR) - an extremely well studied and documented example of primary woodland has over 100 species of *Syrphidae* (Steele & Welch, 1973), of which 13 are primary woodland indicator species.

Placed in this context, the Syrphid data so far available for Friary Wood manifestly suggest that this is an exceptional woodland that needs to be surveyed for a wide range of animal and plant groups. The few plant records that do exist from the 1970's include some very interesting species such as Solomon's Seal (*Polygonatum multiflorum*), Toothwort (*Lathraea squamosa*), Birds Nest Orchid (*Neottia nidus-avis*) and Herb Paris (*Paris quadrifolia*). All these are usually considered to be ancient woodland indicators. This corroborative floral evidence strongly supports the recommendation that this wood should be placed very high on the list of sites in Avon requiring detailed surveying coupled with active conservation and management.

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SAWFLIES, BEES, WASPS, ANTS (*Hymenoptera*) by R.M. PAYNE

Symphyta (Sawflies)

Athalia circularis Walton Moor (SR).

Tenthredo celtica Limebreach Wood (SR).

Tenthredo livida Walton Moor (SR).

Tenthredo schaefferi Eastville (SR).

Aculeata (Bees, Wasps and Ants)

Ancistrocerus gazella St. Andrews (SR).

Dolichovespula sylvestris Harptree Combe (RSC).

Ectemnius cephalotes St. Andrews (SR).

Ectemnius lituratus Barrow Gurney (SR).

Oxybelus uniglumis Newton Park (SR).

Chelostoma campanularum St. Andrews (SR).

Nomada panzeri Lower Wetmoor (SR).

Other Families by R.M. PAYNE

Bibionidae

Bibio leucopterus Middle Hope, 11 May (RWR).

Conopidae

Conops flavipes Blaise Castle, 22 July 1984 (SR).

Conops quadrifasciatus Eastville, 29 July 1984.

Tachinidae

Gymnochaeta viridis One of the less common Green Bottle Flies.

Hippoboscidae

With the help of members of the Chew Valley Ringing Station, some work was done in 1985 on identifying Flat-flies taken from birds ringed in Avon. The following species were recorded:-

Crataerina hirundinis - from House Martins.

Crataerina pallida - from Swifts.

Ornithomyia avicularia - from various Passerines.

Ornithomyia fringillina - from various Passerines.

It is hoped to continue this work in 1986 and to publish a more detailed note in due course.

Proceedings of the Bristol Naturalists' Society (1985), **45**: 53 – 61

BRISTOL BOTANY IN 1985

by A.J. WILLIS

(Department of Botany, University of Sheffield)

The weather in 1985 was notable for below average temperatures, especially in the early months, and for the wet summer, particularly June and August. For the year as a whole, the temperature was 0.6°C below normal, sunshine hours were fractionally below average and rainfall at Long Ashton Research Station, to which all meteorological records relate, was 931.3 mm, 106% of normal. The spring was late and the damp summer may have promoted the growth of such species as *Ophioglossum vulgatum*, cornfield weeds and plants typical of wet areas such as *Glyceria declinata*, which appear to have been vigorous in 1985.

Despite the well-below average temperature in June, in which there was 130.3 mm of rain, more than twice the average, the flowering of orchids was very much more prolific than in 1984, approaching the situation in the very good year of 1983. By the end of June there were at least 1325 flowering spikes of Pyramidal Orchid at Hursley Hill and some 1200 specimens of Bee Orchid at Aust (P.J. Chadwick). As in the previous year, *Potentilla tabernaemontani* developed extremely early at Shute Shelve Hill, being in flower at the beginning of December (RSC).

Study of the occurrence of species of *Rosa* in N. Somerset by comparison of these roses when in good flowering and fruiting condition in a range of localities has substantially elucidated their representation (PJMN); details are given under the entries which follow. A paper entitled 'The genus *Fumaria* in Avon' by P.L. Smith and A.L. Grenfell in these PROCEEDINGS for 1984 (44: 35-42) usefully lists records for the area and also describes and illustrates diagnostic features of the fumitories, a group not well represented around Bristol.

The initiative of R.A. Janes in the study of the Pensford flora has generated interest and filled some gaps in our knowledge of the habitats and species of this part of N. Somerset. The leaflet 'More Pensford Flora' prepared by Rowland Janes, dated 29 September 1985, lists nearly two hundred 'uncommon species' and indicates that, for most of the kilometre squares included in the Pensford flora survey, more than 200 species have already been recorded, and more than 300 for one square.

As in previous years, the continued existence of species in areas from which they have previously been reported, even though sometimes not seen for a number of years, has been shown. Amongst these records may be noted the report of *Pinguicula lusitanica* on Street Heath, *Cyperus fuscus*, albeit in very small amount, in the Gordano Valley and *Carex acutiformis* flourishing in boggy ground between Wraxall and Tickenham (RSC). Of species new to the area, *Orobanche alba* is recorded for the Berrow dunes, a hybrid *Cochlearia* from Sand Point and Brean Down and the alien *Crepis tectorum* is believed new to Avonmouth Docks. The spread of the salt-tolerant *Cochlearia danica* along motorway verges is a novel feature for N. Somerset.

The acquisition of the Mordaunt estate by The National Trust ranging from Crook Peak to Shute Shelve brings a botanically interesting area, including Compton Hill, Wavering Down, Cross Plain and King's Wood, under one management; yet further land may be added in this attractive part of Mendip.

Sadly the death of Professor J.P.M. Brenan, former Director of the Royal Botanic Gardens, Kew, has deprived the area of a well-known botanist who for many years has shown a considerable interest in the Bristol flora, being a close friend of the Sandwiths. He was particularly knowledgeable on the Amaranthaceae and the Chenopodiaceae, and he frequently determined members of these families from the Bristol area, especially the adventive species, many of which have been recorded from the docks and tips.

Names of contributors associated with several records, or with the determination of specimens, are abbreviated thus:

RSC	R.S. Cropper	MARK	M.A.R. Kitchen
TGE	T.G. Evans	CML	Dr C.M. Lovatt
RF	Lady Rosemary FitzGerald	EJMcD	Mrs E.J. McDonnell
IFG	Miss I.F. Gravestock	PJMN	P.J.M. Nethercott
DEG	D.E. Green	RMP	R.M. Payne
ALG	A.L. Grenfell	RDR	R.D. Randall
RAJ	R.A. Janes	RGBR	Capt. R.G.B. Roe, RN
CK	Mrs C. Kitchen	JS	J. Scott

G: Gloucestershire

S: Somerset

For details of the area covered by this Report, see 'Bristol Botany in 1978', p. 35.

Equisetum x *litorale* Kühlew. ex Rupr. A very few plants, rhyne, Lawrence Weston Marsh, Bristol, G, IFG. A very few plants of this hybrid also, with the parent *E. fluviatile* L. nearby in quantity, wet marsh, Emborough Pond, S, IFG.

Ceratophyllum demersum L. Westhay Moor, S, RSC.

Glaucium flavum Crantz A single plant on beach, Stert Island, S, RSC. This is a recent arrival.

Fumaria muralis Sond. ex Koch ssp. *boraei* (Jord.) Pugsl. Waste ground, Churchill, S, RGBR. Also a 'good patch' by track, Worle Hill, S, and two plants on gravel in garden, Burnham-on-Sea, S, RSC. This fumitory has been recorded in a number of North Somerset localities in the last decade (see these PROCEEDINGS for 1984, 44, p. 41).

Cochlearia danica L. In large quantity at edges of central reservation of the motorway (M5) for at least 2½ miles to the west of Kingston Seymour, S, and also between Brent Knoll and Loxton, ALG and J.O. Mountford. This freely seeding annual, typical of saline sites, has successfully colonized the sparsely vegetated parts of motorway verge affected by salt spray from carriageways. The occurrence of halophytes on roadside verges in the north of England is well known, but the present record may be the first in Avon.

C. danica L. x *officinalis* L. With the parent species, Brean Down, S, RSC. This hybrid was drawn to the attention of ALG on Sand Point, S, in 1982, by Mrs M.A. Silcocks, but not seen subsequently by him. These records appear to be the first for North Somerset for this apparently short-lived hybrid.

Draba muralis L. Still on old wall behind church, Lasborough, G, RSC. Flourishing at base of limestone outcrop, Knowle Hill, West Compton, S, RSC.

Cardamine impatiens L. Still in Friary Wood, south of Freshford, S, RSC. Also, in 1984, in Claverton Wood, near Bath, S, RDR; and in 1959 between Charterhouse and the Cheddar Gorge, S, J.I. Robbins.

Hypericum androsaemum L. Two plants in rocky, shrubby area above shore line, below woodland in Kewstoke Toll Road, Weston-super-Mare, S, PJMN.

H. maculatum Crantz A good colony by hedge of field, near Hill, G, CK & MARK, on alluvium where rarely seen. Also at woodland margin, Stinchcombe Hill, G, and two distinct colonies at Parkend, near Leyhill, G, CK and MARK.

Cerastium diffusum Pers. Solsbury Hill, near Bath, S, RDR. This taxon, known previously as *C. atrovirens* Bab., is more common on the coast.

C. pumilum Curt. Bathampton Down, S, RDR.

C. semidecandrum L. Disused coal mine, Stanton Drew, S, RAJ. Also several places on Lansdown and on Bathampton Down, S, RDR.

Stellaria pallida (Dumort.) Piré In annual sward of embankment, Golf Course, Worle Hill, S, CML, conf. ALG.

S. palustris Retz. A small flowering patch, Tealham Moor, S, RSC. Also one plant in rhyne, Edington Heath, S, RSC.

Spergularia rubra (L.) J. & C. Presl Old colliery track, Stanton Drew, S, RAJ.

Montia fontana L. Many plants on bare peat, Tadham Moor, S, RSC.

Chenopodium ficifolium Sm. Roadside, Westbury-on-Trym, G, and Downs, near Downleaze, G, IFG, conf. at BRERC.

Atriplex laciniata L. Persistent at Berrow where about a dozen fine plants on the dunes, and also two plants somewhat further north, S, RSC.

Tilia cordata Mill. A few trees, Daniel's Wood, near Tortworth, G, CK & MARK. Numerous seedlings in parts of Weston Big Wood, near Portishead, S; rather sparse in Leigh Woods, S, and very few in King's Wood, Axbridge, S, PJMN, who notes that seedlings are rather seldom seen and nearly all disappear early. Also, in 1982, on the Oolite, Tait Wood, Hinton Charterhouse, S, DEG.

Erodium maritimum (L.) L'Hérit. Flourishing on bare slopes of old quarry at Cross, S, RSC. Also several plants on rock outcrop, Fry's Hill, Axbridge, S, RSC.

Rhamnus catharticus L. A number of small trees and shrubs on Common Hill, Walton-in-Gordano, S; Wavering Down, S, and Cross Plain, near Axbridge, S, PJMN. Also in Goblin Combe, S, RSC.

Trifolium squamosum L. Still very fine at Sheperdine, G, RSC, also CK & MARK, despite re-building of the sea bank. Also plentiful along east bank of Uphill Pill, S, RSC.

T. striatum L. Battlefields, Lansdown, S, RDR. Also many fruiting plants on dry, rocky slope, Knowle Hill, West Compton, S, RSC. *T. scabrum* L. was also present at both of these localities, RDR and RSC.

T. micranthum Viv. In rocky pasture, Abbotside, near Cromhall, G, CK & MARK. A few flowering patches on garden lawn, Burnham-on-Sea, S, and several plants, with *T. dubium* Sibth., near church, Berrow, S, RSC.

Lotus tenuis Waldst. & Kit. ex Willd. With *Sagina maritima* Don, sea wall, Oldbury Nuclear Power Station, G, CK and MARK.

Lathyrus nissolia L. Abundant along half a mile of the sea wall, Oldbury Nuclear Power Station, G, CK and MARK.

L. montanus Bernh. In 1984, King's Wood, Yatton, S, RF.

Geum rivale L. Damp track, East Harptree, S, RMP. Also hedgebank, West Harptree, S, RMP, where known formerly.

Alchemilla filicaulis Buser ssp. *vestita* (Buser) M.E. Bradshaw Several plants, hilly pasture, East Harptree, S, RMP.

Rosa pimpinellifolia L. The two small colonies reported formerly ('Bristol

Botany in 1964', p. 26) are still present on Cheddar Cliffs (S.E. side), S, PJMN. One colony flowered in 1985.

R. dumetorum Thuill. On Wavering Down and Cross Plain, S, and on both sides of Cheddar Cliffs, S, PJMN, although uncommon in all these sites. This hairy-leaved dog-rose is a segregate of *R. canina* L.

R. tomentosa Sm. Towpath opposite Sea Mills, between the Suspension Bridge and Pill, S, PJMN, as recorded by White (*Flora of Bristol*, 1912, p. 292). One bush in hedge, Norton Hawkfield, S, PJMN.

R. micrantha Borrer ex Sm. This small-flowered sweet briar was reported from Walton-in-Gordano in 'Bristol Botany in 1984', p. 65. Detailed studies by PJMN has now shown its presence in seven localities in S (v.c. 6) as follows: (1) along towpath under Leigh Woods, sparingly; (2) Walton-in-Gordano, much on Walton Common and occasional elsewhere in the Parish; (3) Weston-in-Gordano, sparingly on Weston Common; (4) much on Tickenham Hill, and also on ridge towards Clevedon and sparingly in woodland ride about Clevedon Court; (5) much on Crook Peak and Wavering Down, and sparingly on Compton Hill and Cross Plain (also with aciculate hips on Crook Peak and Wavering Down); (6) Shute Shelve; (7) sparingly on both sides of the Gorge, Cheddar Cliffs (where recorded in the Cheddar Gorge Survey, these PROCEEDINGS for 1969, 31, p. 646). This rose is also independently reported in 1985 from Fry's Hill, Axbridge, S, EJMcD.

R. agrestis Savi Currently known in S (v.c. 6) in five localities as a result of searches by PJMN as follows: (1) some five bushes on Tickenham Hill (cf. 'Bristol Botany in 1962', p. 301); (2) Walton-in-Gordano - Common Hill, rather more bushes; (3) Wavering Down, where previously unrecorded, the largest pure and most important colony in v.c. 6; (4) Middle Hope, where most bushes are hybrid (see 'Bristol Botany in 1964', pp. 26, 27, where the hybrid *R. agrestis* Savi x *R. stylosa* Desv. determined by the late Dr R. Melville was reported); (5) Brean Down, in very small number. Hybrids appear to occur in all of these localities except Wavering Down, some bushes, e.g. at Middle Hope, showing marked hybridity, usually with *R. stylosa* as the other parent, but perhaps *R. micrantha* or *R. canina* s.s. on Walton Common as *R. stylosa* seems absent from this site. The pattern of distribution of *R. agrestis* in v.c. 6 is of a rose on Carboniferous Limestone not far distant from the sea. The closely similar *R. elliptica* Tausch has been reported from Brean Down in the past but, despite searches, not seen there by PJMN.

Crataegus laevigata (Poir.) DC. (*C. oxyacanthoides* Thuill.) Hedge, Milton, Weston-super-Mare, S, EJMcD, conf. RGBR. Also in 1983, on edge of Prior Park, Bath, S, Dr A.C. Baines. The 'Midland Hawthorn' is very rare in Somerset.

Sorbus torminalis (L.) Crantz In 1983 a single tree was recorded from Wick Rocks, G ('Bristol Botany in 1983', p. 67). Further study of this area by PJMN shows the presence of several trees, and also a young tree (clearly arisen from seed and not a sucker) below a rockface above which a mature tree grows.

Torilis nodosa (L.) Gaertn. Cross Plain, S, RSC. Also between pavement and wall, Clevedon, S, CK and MARK.

Bupleurum tenuissimum L. A single plant, saltmarsh, Littleton Pill, G, CK and MARK.

Oenanthe fistulosa L. With *Zannichellia palustris* L., brackish pond, Oldbury Pill, G, CK and MARK. Also at Hill Pill, G, and Maniards Green, near Hill, G, CK and MARK.

O. pimpinelloides L. In two localities at Hill, G, and abundant at Rockhampton G, CK and MARK.

Euphorbia lathyrus L. One large plant on wharf, Dundas Aqueduct, S, RSC. Also many hundreds of fruiting plants on slope near road, Compton Bishop, S, RSC, on ground burnt in 1984.

Salix triandra L. By road, Sheperdine, G, CK and MARK. Walton Drove, Walton-in-Gordano, S, CK and MARK. Recorded in this locality by White (*Flora of Bristol*, 1912, p. 535).

Arbutus unedo L. A solitary bush in Leigh Woods, S, is noted in 'Bristol Botany in 1960', p. 109. This is now a medium-sized tree, with at least four others seeded from it below the quarry edge, PJMN.

Monotropa hypopitys L. Six plants in beech wood, Dursley, G, CK and MARK.

Anagallis arvensis L. var. *carnea* Schrank Several plants, with normal colour form, in grassland, Tickenham Hill, S, PJMN.

Symphytum tuberosum L. In 1984, Wadleigh Woods, Bamford, S, RDR. This may have been introduced by tree planting.

Echium vulgare L. In 1983, Claverton Wood, Bath, S, RDR; also in 1983 at Corston, S, J. George.

Hyoscyamus niger L. In 1984, South Stoke, S, DEG.

Linaria repens (L.) Mill. Disused railway, Stanton Drew, S, RSC.

Orobanche alba Steph. ex Willd. Dunes, Berrow, S, J.R. Comley, apparently on *Glechoma hederacea* L.

O. hederae Duby In 1984, roadside, Newton-St-Loe, S, Miss J. Foster.

Pinguicula lusitanica L. Re-discovered on Street Heath, S, Mrs M. Collins, and seen by RSC. About half a dozen plants, some flowering, were on the bare margins of a steep-sided pit. This Butterwort was formerly more frequent on the peat moors.

Mentha x *smithiana* R.A. Grah. A good clump, Rowberrow Bottom, S, G.P. Kidder (also seen by RSC).

Galeopsis angustifolia Ehrh. ex Hoffm. Rubbish tip, South Stoke, S, DEG.

Plantago coronopus L. Axbridge Hill, S, EJMcD. Also in a few places, Wavering Down, S, PJMN, low on the hill. This species is common on the coast and inland records may indicate an old shore line.

Legousia hybrida (L.) Delarb. In field of peas, Lansdown, S, RDR.

Filago vulgaris Lam. (*F. germanica* (L.) L.) Axbridge Hill and Fry's Hill, S, EJMcD. Also several plants on bare slopes of old quarry, Cross, S, RSC.

Achillea millefolium L. In 1984, plants with deep red flowers growing with the usual white form in several places, Siston Common, G, PJMN. While this area is now poor botanically, with areas re-seeded, depressions filled and goats tethered, several colonies of *A. ptarmica* L., with many plants, are thriving in the southern part of the Common (White, *Flora of Bristol*, 1912, p. 373, records it as 'quite sparingly' there), PJMN.

Artemisia absinthium L. Several plants in field gateway and under wall nearby, Worle Hill, S, CML.

A. maritima L. Two good colonies on old sea wall, Oldbury Nuclear Power Station, G, CK and MARK.

Carduus nutans L. Several plants with white flowers, Middle Hope, S, PJMN.

C. x *orthocephalus* Wallr. One plant in large patch of *C. acanthoides* L., South Stoke, S, RDR.

Lactuca virosa L. In 1984, waste ground, Wells, S, CML.

Taraxacum cyanolepis Dahlst. In 1983, Kenn Moor, S, RF, det. C.C. Haworth.

Baldellia ranunculoides (L.) Parl. A few flowering plants in rhyne, Catcott Grounds, S, RSC.

Alisma lanceolatum With. One plant in roadside rhyne, Mark, S, RSC.

Polygonatum multiflorum (L.) All. In woods bordering lake, Emborough Pond, S, IFG.

Allium oleraceum L. Woods near Penpole Point, Shirehampton, Bristol, G, IFG. Several plants, Burledge Hill, south of Bishop Sutton, S, RMP and RGBR.

Spiranthes spiralis (L.) Chevall. Frequent, Cross Plain, S; also Wavering Down, S, and Tickenham Hill, S, PJMN. One fine flower spike, Burledge Hill, S, RSC. Also one plant, hilly pasture, East Harptree, S, RMP.

Platanthera bifolia (L.) L.C.M. Richard Max Bog, Winscombe, S, RMP.

Orchis morio L. Many fine plants in limestone grassland, Knowle Hill, West Compton, S, RSC. Also much *Gymnadenia conopsea* (L.) R. Br.; other plants at this site include *Oenanthe pimpinelloides* L., *Rumex pulcher* L. and the grasses *Vulpia bromoides* (L.) Gray and *Aira caryophyllea* L., RSC.

Wolffia arrhiza (L.) Hork. ex Wimm. With *Lemna polyrhiza* L. and *L. gibba* L., Banwell, S, RSC.

Carex extensa Good. Three plants on sea wall, Oldbury Nuclear Power Station, G, CK and MARK.

C. acutiformis Ehrh. Abundant in boggy ground at Stone-edge Batch, S, RSC. This sedge is recorded by White (*Flora of Bristol*, 1912, p. 640) as 'abundant in a marsh under the hill between Wraxall and Tickenham', probably from this site. *C. paniculata* L. persists (several large tussocks) in boggy woodland nearby, RSC (see White, *loc. cit.*, p. 627). It is believed (RSC) that this area is the one referred to by White (*loc. cit.*, pp. 630 and 680) as 'waterholes (spring heads) in a marsh under the high ground between Wraxall and Tickenham', under the entries for *Carex elata* and *Lastrea thelypteris* (*Thelypteris palustris*). Although neither of these plants can now be found here, the flora in this vicinity includes *Myosotis caespitosa* K.F. Schultz, *Triglochin palustris* L., *Dactylorhiza praetermissa* (Druce) Soó and *Geranium rotundifolium* L.

C. humilis Leyss. Two patches in *Festuca* turf, Cross Plain, S, PJMN. This sedge is also maintaining itself well in Crook Peak (where recorded in 1964), PJMN. Consequently, a chain of localities can be recognised, Brean Down - Crook Peak - Cross Plain, with the next eastwards locality over thirty miles away, at Edington on the Wiltshire Chalk, PJMN.

Festuca rubra L. ssp. *pruinosa* (Hack.) Piper One small clump on old sea wall, with ssp. *litoralis* (G.F.W. Meyer) Auquier, the common subspecies along the banks of the Severn, Oldbury Nuclear Power Station, G, TGE and MARK, det. TGE, conf. RMP.

Puccinellia distans (L.) Parl. Sheperdine, G, RSC, and North Ham Corner, G, CK and MARK. Also along the River Axe, S, RSC.

Catabrosa aquatica (L.) Beauv. Several fine patches in stream, Stone-edge Batch and near Nailsea, S, RSC. Several patches in and near Westhay Moor, S, and two flowering patches, Tealham Moor, S, RSC. Also in an old lane, Winscombe, S, PJMN.

Bromus commutatus Schrader Abundant in meadow, Stuckmoor Lane, Hill, G, CK and MARK.

Parapholis strigosa (Dumort.) C.E. Hubbard Saltmarsh, Littleton Pill, north of Pill, G, and still at Sheperdine, G, CK and MARK.

ALIENS. *Hirschfeldia incana* (L.) Lagr.-Foss. In 1984, abandoned coalmine, Stanton Drew, S, RAJ and RMP.

Camelina microcarpa Andrz. ex DC. In 1984, rubbish tip, Weston-super-Mare, S, TGE and ALG.

Amaranthus retroflexus L. In 1984, disused railway, Midford, S, DEG.

Vicia villosa Roth In 1983, waste ground, Lower Weston, Bath, S, RDR.

V. sativa L. ssp. *sativa* Edge of cornfields, South Stoke, S, DEG.

Cotoneaster simonsii Bak. Two bushes in hedge, remote from buildings, East Harptree, S, RMP, conf. ALG.

C. dammeri C.K. Schneid. In 1984, dominant on 50 metres of railway embankment, St. Philip's Marsh, Bristol, G, ALG. The derelict railway land at St. Philip's has now been redeveloped as an industrial estate, including the area formerly supporting the large colony of *Poa palustris* L.

C. lacteus W.W. Sm. Abundant under wall along railway line, Cumberland Basin, Bristol, G, ALG.

Pyrus communis L. One tree, N.W. side of Cheddar Cliffs, S, PJMN, presumably arising from a discarded pear core.

Saxifraga rosacea Moench Old railway line, Windsor Hill, Shepton Mallet, S, Mrs N. Vaughan-Davies, BNS Field Meeting 1983, det. Professor D.A. Webb. This red-flowered plant was gathered and garden-grown by IFG who sent specimens to Professor Webb. He reports this of interest as having set seed as a naturalised plant, and considers it a garden cultivar or perhaps hybrid. A similar plant was seen in a hedgerow above the railway tunnel a short distance away in 1964-65, IFG.

Oenothera cambrica Rost. In 1983, waste ground, Bath, S, RDR.

Reynoutria sachalinensis (Friedrich Schmidt Petrop.) Nakai Abundant around Tortworth Lake, G, CK and MARK.

Quercus x *hispanica* Lam. A single clump of the Lucombe Oak amongst naturalised *Q. ilex* L., Well Hill, Worlebury, Weston-super-Mare, S, ALG, RGBR, CML *et al.*

Trachystemon orientalis (L.) G. Don A well established colony, woods near Kingsweston House, Shirehampton, Bristol, G, RF, CK and MARK.

Physalis peruviana L. (*P. edulis* Sims) Upwards of 100 plants, Avonmouth Sewage Works, G, ALG, TGE and JS. An addition to the adventive list.

Linaria maroccana Hooker f. Rubbish tip, Pensford, S, RAJ, det ALG.

L. supina (L.) Chazelles Still at Avonmouth, G, ALG, but much reduced (see 'Bristol Botany in 1982'). Despite searches, no hybrids of this plant have been found.

Melissa officinalis L. By wall, Tortworth Estate, Parkend, near Leyhill, G, CK and MARK.

Perovskia atriplicifolia Benth. Laneside, Lawrence Weston, Bristol, G, IFG, det E.J. Clement. Presumably arising from dumped garden rubbish.

Stachys byzantina C. Koch In 1984, with *Sorghum halepense* (L.) Pers., rubbish tip, Weston-super-Mare, S, A.J. Byfield and RF.

Senecio x *albescens* Burbidge & Colgan (*S. cineraria* DC. x *jacobaea* L.) Adjoining *S. cineraria* DC., disused platform, Sea Mills Station, G, IFG, det ALG.

Aster lanceolatus Willd. In 1984, a large clump at edge of woodland, Chew Valley Lake, S, RMP.

Conyza canadensis (L.) Cronq. In 1984, a single plant on dried-up bed of reservoir, Chew Valley Lake, S, RMP.

Hieracium speluncarum Arv.-Touv. Noted as plentiful on walls at Mells, S, in 1905 by G.B. Milne-Redhead (per E. Milne-Redhead).

Hyacinthoides hispanica (Mill,) Rothm. x *non-scripta* (L.) Chouard ex Rothm. Stoke Bishop, Bristol, G, IFG.

Dracunculus vulgaris Schott In shrubbery, Chelwood, S, RAJ.

Cynosurus echinatus L. In 1984, newly-made garden, Bath, S, RDR.

Bromus madritensis L. var. *ciliata* Guss. Waste ground, Walton-in-Gordano, S, PJMN. This variety with hairy spikelets is adventive.

B. tectorum L. In 1983, roadside, Walton-in-Gordano, S, J.O. Mountford.

Setaria verticillata (L.) Beauv. Garden, Frome, S, Dr A.G. Duff, conf. ALG.

Panicum dichotomiflorum Michx. A colony of small plants on roadside verge adjoining the Avonmouth Sewage Works, G, ALG. Also on this verge many plants of *Chenopodium probstii* Aellen, first noticed in larger quantity in 1984, ALG.

OTHER ALIENS. Elberton (Harnhill) Tip/Quarry, G. Among typical tip species were the following, including bird seed aliens: *Consolida ambigua* L., *Lepidium sativum* L., *Melilotus indica* (L.) All., *Cannabis sativa* L., *Kickxia spuria* (L.) Dumort., *Carthamus tinctorius* L., *Guizotia abyssinica* (L.f.) Cass., the native *Glyceria declinata* Breb. (frequent), *Echinochloa utilis* Ohwi & Yabuno, *E. frumentacea* Link, *Setaria viridis* (L.) Beauv., *S. lutescens* (Weigel) F.T. Hubbard and *S. italica* (L.) Beauv. All records TGE.

The following 1984 records were made by ALG & TGE: *Callistephus chinensis* (L.) Nees (*Aster sinensis*), *Citrullus lanatus* (Thunb.) Mansfeld, *Cosmos bipinnatus* Cav., *Cucumis melo* L., *Cucurbita pepo* L., *Echinocloa frumentacea* Link, *E. utilis* Ohwi & Yabuno, *Echium plantagineum* L., *Guizotia abyssinica* (L.f.) Cass. - fruiting (unusual in Britain), *Nicandra physalodes* (L.) Gaertn., *Nicotiana alata* Link & Otto (also on Brislington Tip in 1982, ALG) and *Xanthium strumarium* L. ssp. *strumarium* (*X. sibiricum*).

Avonmouth Docks, G. In recent years this area has failed to yield the numerous aliens of earlier decades. However, diminished use of herbicides in 1985 saw the rail tracks and waste areas green once more. Particularly plentiful were the crucifers *Erucastrum gallicum* (Willd.) O.E. Schulz, *Erysimum cheiranthoides* L., *Sisymbrium loeselii* L. and *Descurainia sophia* (L.) Webb ex Prantl. Also the rare grass *Beckmannia eruciformis* (L.) Host was abundant as well as *Setaria faberi* Hermm. Of special interest was the presence of many plants of *Crepis tectorum* L., which, although of European origin, was apparently introduced with North American grain; this plant is believed to be new to the Bristol area. Other species included much *Ammi majus* L., single plants of *Camelina sativa* (L.) Crantz and of *Vaccaria hispanica* (Mill.) Rauschert, and a solitary seedling of

Caesalpinia spinosa (Mol.) O. Kuntze, known as the pea 'Tara' from the deserts of western S. America. All records ALG, TGE and JS. See *Adventive News 33* (in *B.S.B.I. News* No. 42, pp. 16 and 17, April, 1986) for some further details and an illustration of *Crepis tectorum*.

Weston-super-Mare (Locking) Tip, S. Altogether some 137 taxa were recorded in 1984. Among the more notable were: *Ailanthus altissima* (Mill.) Swingle, *Cannabis sativa* L., *Centaurea gymnocarpa* Moris & De Not., *Citrullus lanatus* (Thunb.) Mansfeld, *Consolida ambigua* (L.) P.W. Ball & Heywood, *Datura stramonium* L. var. *tatula* (L.) Torrey, *Echinochloa utilis* Ohwi & Yabuno, *Nicandra physalodes* (L.) Gaertn. and *Sorghum halepense* (L.) Pers. All records RF, A.J. Byfield, ALG and TGE.

I thank everyone who has supplied records and helped with these, especially Mr P.J.M. Nethercott, Captain R.G.B. Roe and Mr A.L. Grenfell. I am indebted to Long Ashton Research Station for meteorological records.

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THE *PROCEEDINGS*

An Important Change of Policy

THE 1988 ISSUE

Both your Publications Committee and Council have decided that there is a need for some change in the presentation of future issues of the *Proceedings* to give the journal more focus and interest. We can do nothing about the 1987 issue for which the closing date for submission of papers is now very close, but for the 1988 issue it is proposed to invite original papers upon a theme, rather than the present practice of publishing a miscellany of unrelated papers.

The theme chosen for the 1988 issue is:-

"The Avon Gorge"

and your Committee invites contributions of any kind, of any length and on any topic relevant to this theme. In addition, we intend to commission papers from interested authors. The target date for submissions is the end of February 1988.

THE 1989 ISSUE

We have tentatively adopted for this issue the theme of:-

"Urban Ecology in the Bristol Region"

so that members can have plenty of time to think about a possible contribution, which will be needed by the end of February 1989.

THE 1987 ISSUE

This is the forthcoming volume of the *Proceedings* and it will have the same format as recent past issues.

A.E. FREY, Hon. Editor

February 1987

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